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ABSTRACT

All second and third graders in California public schools were administered the Reading Test of the California Assessment Program; performance of all sixth and twelfth graders in reading, written expression, spelling, and mathematics was assessed with the Survey of Basic Skills. Findings were compared to those of previous years and can be summarized as follows: (1) Reading achievement scores (grades 2 and 3) have been improving steadily since 1966. (2) Sixth graders improved in all four content areas. (3) Grade 12 students improved in written expression and spelling, held steady in mathematics, but continued to decline in reading. (4) Equating studies indicated that grades 3 and 6 scored above the national median; grade 12 scored below. (5) At all grade levels, females outscored males in reading, while the reverse was true of math. (6) Pupils who spoke limited English scored substantially lower than fluent English groups. (7) Test scores and socioeconomic status were directly related. (8) Student mobility continued to increase. Recognized authorities made instructional recommendations in each content area based upon the findings. Sample test questions are presented to illustrate the relative strengths and weaknesses of California students. (Author/CP)

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Student Achievement in California Schools

1977-78 Annual Report

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California Assessment Program

CALIFORNIA STATE DEPARTMENT OF EDUCATION • Wilson Riles, Superintendent of Public Instruction • Sacramento, 1978

California Assessment Program

Student Achievement in California Schools

1977-78 Annual Report

Prepared Under the Direction of
Alexander I. Law, Chief
Office of Program Evaluation and Research

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I. Summary of Findings

During the 1977-78 school year, all second grade pupils (311,905) and third grade pupils (301,022) in California public schools were tested in reading achievement. All pupils in grade six (294,794) and grade twelve (244,233) were tested in the basic skills of reading, written expression, spelling, and mathematics.

Grades Two and Three Results

Reading achievement test scores for second and third grade pupils have been improving steadily since statewide testing in those grades began in 1966. This trend has continued through 1978. A summary of the test results is presented in Table 1. The overall gain in 1977-78 of second grade pupils was 0.5 percent correct, and the overall gain of pupils in grade three was 0.5 percent correct. These gains reflect pupil performance on the California Assessment Program's Reading Test, which was constructed specifically to assess the students' attainment of proficiency in the broad range of reading programs in California's public schools.

Special equating studies were conducted to determine the relationship of the current performance of California pupils to the 1973 (the latest year for which comparable figures were available) performance of a sample of pupils across the nation. The median second and third grade pupils in California were determined to be at the 55th and 57th percentile ranks, respectively.

Grade Six Results

All students in grade six took the Survey of Basic Skills: Grade 6, another test developed (in 1974-75) specifically for the California Assessment Program. The scores of California sixth grade students improved in all content areas tested: reading, written expression, spelling, and mathematics (see Table 1). The gain was greatest in mathematics (0.8 percent correct) and least in reading (0.4 percent correct). An equal amount of gain (0.5 percent correct) was achieved in the areas of written expression and spelling.

An equating study provided a basis for comparing California students with a national sample of students tested in 1973. Based on the results of the study, the median sixth grade student in California is now above the national median in all areas. In mathematics the median sixth grader in California moved from the 51st to the 53rd percentile rank in 1977-78. The median student moved from the 53rd to the 55th percentile rank in reading and remained at the 51st percentile rank in written expression.

The report includes an analysis of the differences between the relative performances of boys and girls for each of the skill areas within mathematics. Overall, boys continue to score higher than girls, with the notable exceptions in the areas of whole number computations, fraction computations, and decimal computations. For more complex tasks, especially those involving reasoning and problem solving, however, the reverse trend is equally strong; that is, the boys outscore the girls.

Grade Twelve Results

All students in grade twelve took the same test that was administered in 1976-77--the Survey of Basic Skills: Grade 12. Reading performance continued to decline (by 0.3 percent correct), mathematics scores held steady; and written expression and spelling both improved (0.2 and 0.5 percent correct, respectively).

Special equating studies provide a basis for comparing the performance of California twelfth graders with that of national test publishers' norm samples tested in 1962 and 1970. On the basis of the 1962 norms, the median twelfth grade student in California in 1977-78 was at the 42nd percentile rank in reading, the 34th percentile rank in written expression, and the 43rd percentile rank in mathematics.

Comparisons with two other tests with 1970 norms placed California twelfth grade students somewhat lower: at the 32nd and 35th percentiles in reading, at the 26th and 28th percentiles in written expression; and at the 41st and 43rd percentiles in mathematics.

The relative performance of boys and girls was also analyzed for grade twelve mathematics. The gap between boys and girls is substantial by this grade level, with boys typically scoring higher. The only skill areas in which girls consistently outscore boys are those of whole number and decimal computations, as was also true for grade six. The girls at the twelfth grade scored especially low in measurement, geometric applications, and probability and statistics. The report also includes an analysis of the results for boys and girls according to the number of mathematics courses they had completed.

Subgroup analyses

Statewide test performance was analyzed separately for several different subgroups of pupils. A summary of the main findings is presented below:

1. Girls scored higher than boys did in reading, and boys scored higher than girls did in mathematics. In reading, the gap between the boys and girls continued to decrease at all grade levels. The difference between boys and girls in mathematics did not change since 1976-77. Most of these differences are quite small; however, the boys' lead in mathematics at grade twelve is quite substantial.

Table 1

Number of Students Tested and Average Percent of Questions Answered Correctly by Grade Level and Content Area for 1975-76, 1976-77, and 1977-78

Grade level and content area	Number tested	Average percent of questions answered correctly				
					Difference	
		1975-76	1976-77	1977-78	1975-76 to 1976-77	1976-77 to 1977-78
Grade 2 -- Reading	311,905	67.7	68.4	68.9	+0.7	+0.5
Grade 3 -- Reading	301,022	81.4	81.7	82.2	+0.3	+0.5
Grade 6	294,794					
Reading		66.1	65.9	66.3	-0.2	+0.4
Written Expression		62.5	63.6	64.1	+1.1	+0.5
Spelling		63.6	63.6	64.1	-0-	+0.5
Mathematics		57.4	57.7	58.5	+0.3	+0.8
Grade 12	244,233					
Reading		64.1	63.6	63.3	-0.5	-0.3
Written Expression		62.3	61.9	62.1	-0.4	+0.2
Spelling		68.0	67.9	68.4	-0.1	+0.5
Mathematics		67.0	66.3	66.3	-0.7	-0-

2. Pupils who spoke Japanese or Chinese in addition to fluent English scored higher than any other group of pupils (grouped according to language background). Pupils who spoke only English scored nearly as high. The students who spoke limited English and another language scored substantially lower than the other groups. Nearly all groups scored higher in 1977-78 than in 1976-77.

   Within the two categories of "fluent English and another language" and "limited English and another language," those students whose other language was Spanish scored substantially lower than those whose other language was other than Spanish. Further, a greater proportion of students were coded in these categories in 1977-78.

3. There was a fairly direct relationship between test scores and parental occupational level. The higher a parent's occupational level, as defined chiefly by the amount of education required for the parent's occupation, the higher the student's test scores. More significantly, the gap between the average scores of the pupils from the highest economic, or occupational, levels and those from the lowest economic levels continued to decrease since 1976-77.

4. Pupil mobility continued to increase from 1976-77 to 1977-78. Although the less mobile pupils continue to score higher than the more mobile pupils, the margin continued to shrink.

The major portion of this report is devoted to an analysis of the specific test findings for each subject area. Example test questions are presented to illustrate the relative strengths and weaknesses of California students. The discussion of results for each content area is based heavily on the comments of recognized authorities who reviewed the findings and pointed out implications for the improvement of California's school programs.

II. Introduction to the Report

This report contains the complete statewide results of the California Assessment Program, including the following key features:

- Detailed findings. Information is presented not only for the major content areas of reading, written expression, and mathematics but also for a variety of specific skill areas within each major area. This year for the first time, the skill area findings for mathematics have been analyzed and reported separately for boys and girls.

- National comparisons. Although tests were developed to correspond specifically to the skills and concepts being taught in California schools, special studies have been conducted to show how the performance of California students compares with that of recently tested samples of students from throughout the nation.

- Expert opinions. Recognized authorities in each professional field have presented their interpretations of the results for each of the content areas by identifying skill areas of relatively impressive student performance and other skill areas that need attention. This year's report also offers some classroom instructional strategies suggested by the various subject matter committees to overcome these weaknesses in student performance.

- Comparable results. The tests used in the California Assessment Program have been developed and refined to the extent that they can continue to be used without revision for a period of years. All results in this report are comparable to those of the last two years.

- Subgroup analyses. With the stability of the tests, it has become possible and appropriate to examine the differences in standing and in rate of progress among various subgroups of pupils. Three years of findings for different groups of pupils are included in this year's report.

Development of the California Assessment Program

The California Assessment Program was first fully implemented in 1974-75. In design, development, and procedures, it is unique in the nation. The assessment program was designed with several criteria in mind: (1) It must be relevant to California schools; (2) It must cover the full range of instructional objectives; (3) It must provide program-diagnostic information at the local and state levels; and (4) It must take only a minimum of testing time. This section describes the process of developing such a program.

Background and Assumptions

The new assessment program had its foundation in two legislative acts: (1) the California School Testing Act of 1969, a revision of a 1961 law which first required an achievement testing program in the public schools; and (2) the Miller-Unruh Basic Reading Act, which originally required reading tests in grades one, two, and three. The testing program was revised by 1972 legislation, and major changes were made in the program as a result of that legislation.

The changes in the statewide testing program were based on the principle that an efficient state testing program has to be limited in scope--that is, limited primarily to the task of furnishing useful information to state-level policy-makers and decision-makers. It was assumed that the program could not meet all of the many information needs of local school district personnel and that assessment information needed at the classroom level could best be collected by local school personnel.

In spite of this assumption, the program was designed to report as much information as possible to local personnel. Since all students at a grade level in all schools were tested, it was possible to provide very detailed analytical reports for each school to supplement locally obtained information. In fact, the results of a survey of all districts in California showed that most districts have found this unique information very useful in evaluating and revising programs. Board members and other local citizens have relied heavily upon statewide results in making judgments about local needs and accomplishments primarily because of the uniform and comparable nature of the information provided.

Reasons for Revising the Testing Program

Two major problems were addressed through the revision of the statewide testing program:

1. Test relevancy and breadth. The incomplete match between the relatively narrow range of skills measured by any one published standardized test, on the one hand, and the variety of instructional programs in California schools, on the other, made it difficult to assess the skills of California students or the effectiveness of the programs with any degree of assurance of fairness. Furthermore, it was not possible to assess the relative strengths and weaknesses of California students in order to have an indication of how instructional programs should be redirected, since the standardized tests being used yielded only total scores.

2. Testing time. Previous testing instruments required an inordinate amount of pupil time for the testing process--inordinate, at least, in relation to the usefulness of the results. The use of a new testing technique called matrix sampling has now reduced the amount of testing time at certain grade levels from as much as three and one-half hours to 30 minutes. Under this sampling method, all students at a grade level in all schools are tested, but each student takes only a portion of the total test. Results for an individual student cannot be obtained, but quite accurate estimates of the overall performance of groups of students can be computed.

Development of the New Tests

The development of tests related to California goals and objectives followed a rigorous procedure. The major steps are outlined below:

1. Statewide committees of content area experts were formed and charged with the task of translating and delineating the general goals found in state-adopted curriculum frameworks into more specific objectives appropriate for assessment.

2. These specific objectives, or test content specifications, were then reviewed by personnel in all California school districts for completeness and relevance to their instructional programs. The revised specifications served as the basic guidelines for selecting and developing pools of test items. These documents were subsequently printed and distributed to all school districts under the general title Test Content Specifications.

3. These content specifications were sent to major test publishers who identified those test questions which matched the specifications. These were submitted to the Department of Education for review.

4. From the initially large pools of items, teams of classroom teachers reviewed and selected the items that were most appropriate for California students.

5. These items were then reviewed by linguists and minority group testing experts for any subtle biases against students of different language or cultural backgrounds.

6. The final pools of items, several hundred at each grade level were then divided into several short tests or forms--from 10 to 18 per grade level. All test forms were made equivalent in difficulty and in coverage of major skill areas.

The National Norm Dilemma

Since 1962, the first year of statewide testing in California, all tests adopted for use had been commercially published instruments with "national" norms. The new tests described in this report were constructed specifically for use in California schools. The decision to develop tests rather than use commercial "off-the-shelf" tests with national norms was not made casually. Comparison to national averages are not only interesting but are useful as a basis for judging the overall relative effectiveness of California's instructional programs. Furthermore, California law (Education Code sections 60663 and 60640) requires that such information be made available.

A real dilemma, one with both philosophical and technical aspects, faces anyone who would measure the basic skills of California students: to choose a test which has national norms but fails to address all the skills taught in California schools, or to develop a relevant test which does not allow easy and immediate national comparisons. Assessment programs in other states are about equally divided between these two approaches. After eleven years of using tests with national norms but less than satisfactory coverage of the skills being taught in California schools and after observing the difficulties faced by other states in interpreting the results from their own tests without national norms the course to be followed was obvious: Develop a test which fits the instructional programs of most California schools and then find a way to compare those results to national norms.

A plan which could accomplish this (allow one to have one's cake and eat it too) had to overcome two main problems with the national norms associated with published standardized tests.

1. No single test is given to all students in the country. Of necessity, a publisher's norm is, therefore, only an estimate of what the distribution of scores would be like if, in fact, the test had been taken by all students in the United States. For this reason, norms vary from publisher to publisher, sometimes in the extreme. In California's own recent history, the Stanford Reading Test was administered to all second grade pupils in the 1969-70 school year, and the median California pupil scored at the 38th percentile of that publisher's norms. In the following year the Cooperative Primary Reading Test was administered to all second grade pupils. The median California pupil scored at the 50th percentile of that publisher's norms. The different result was clearly a reflection more of the difference in norms than of the difference in reading achievement.

2. A second problem with norms is that they are not updated very often. For instance, the Cooperative Primary Reading Test was normed during the 1965-66 school year. As a result, when those norms are referred to, it must be clearly understood that the comparisons being made are to the publisher's estimate of what scores on that test would have been if administered to all pupils in the country at that time. If reading scores for the nation had dropped continuously since 1965-66, an "average" score for California pupils might, in fact, reflect achievement far above current nationwide averages.

The resulting plan is straightforward and efficient. It involves the equating of the California tests to standardized tests with national norms and updating those comparisons as new norms or new tests become available. The equating process requires that a sample of pupils take both the California test and one of the other tests. The effect of the statistical analyses following the testing is to show how California students would have scored if they had all taken the standardized test. Following recent refinements to the equating procedures, a study now has to be conducted only once, but the annual progress on the California test can be translated into the appropriate national percentile ranks (against the year in which the publisher's test was normed, of course, not against the national performance for that year. The latter would be most useful information, but it is simply not obtainable).

This solution has several advantages: (1) the national comparisons are more timely since they can be updated as new norms become available; (2) the estimates are more stable since they do not depend on the representativeness of a single publisher's sample; and (3) it allows California schools to be assessed with a test which fits the objectives of the instructional program, and simultaneously, with almost no additional testing, allows that performance to be compared to national norms.

Essential Information About the Numbers Used in This Report

The percent correct score. The statistic used in this report to indicate the achievement levels of California pupils is the "average percent correct score." For a given set of test questions, this number is the percentage of correct test responses, with one response being equal to the answer of one student to one question, and the total number of responses being equal to the answer of one student to one question, and the total number of responses being equal to the number of students multiplied by the number of items on the test. For example, if three students took a test with ten questions and if each of the three answered five of the ten questions correctly, the total number of responses would be 30, the total number correct would be 15, and the average percent correct score would be 50. It can also be said that the average student answered 50 percent of the questions correctly; or that, on the average, 50 percent of the questions were answered correctly.

The average percent correct score and the simultaneous presentation of illustrative test questions or exercises are designed to add to the clarity and usefulness of the findings. It should be easier, as a result, to see what California students are able to do. Unfortunately, this method is so new in educational evaluation and assessment that guidelines and rule-of-thumb benchmarks are not available. Each reader will have to evaluate the adequacy of the results. The emphasis is on establishing realistic and necessary levels of actual competence rather than on the traditional comparing of results to a national norm.

How high is high? It will be noted that most of the average percent correct scores hover around the 60s and 70s; however, some are down in the 30s, and some are up in the 90s. Two points must be kept in mind in interpreting these figures:

1. The major reason that the average scores are in the 60s and 70s, rather than the 90s, is that the aims of the instructional programs at each level in California schools go beyond the basic, minimal levels of performance expected of all students. In reading, for

example, those skills which are mastered by most students by the end of the second grade are not even tested in the sixth grade. Testing time is too valuable and the scoring and the processing too expensive to justify gathering information which does not add to what is already known about California students.

2. It should be obvious that high scores in particular subskill areas do not necessarily indicate effective programs; nor low scores, the opposite. Some tasks are inherently more difficult. In reading, for example, it is not considered outstanding that by the end of grade three, nearly all students can immediately recognize and read certain short words; nor is it at all disappointing that only about 60 percent can answer certain questions requiring a student to recognize cause-and-effect relationships among sentences.

Interpretations of experts. The overall results and especially the differences among various subcontent or skill areas have been reviewed by special advisory committees of highly respected educators in each field. It is hoped that their comments about the adequacy of the findings and their discussion of the implications for shifts in program emphasis will be helpful both to the professional educator and the lay citizen concerned with education in California. Obviously, however, not all readers will agree with the opinions of the specialists. Any discussion or inquiry which is stimulated by these opinions is useful in that it will help to clarify the proper objectives of the schools and foster realistic expectations of them.

III. Reading Achievement for Grades Two, Three, Six, and Twelve

Synopsis of Findings

California's second, third, and sixth grade pupils continued to show improvement in reading achievement from 1976-77 to 1977-78 and continued to score above the national average. Twelfth grade students, scoring below national norms, declined for a second consecutive year. Over the past 12 years, reading achievement test scores in grades two and three have shown slow but steady improvement. Second grade scores increased slightly (0.5 percent correct) from 1976-77 to 1977-78; the median second grade pupil is scoring at the 55th percentile rank--5 points above the national average. Third grade scores increased 0.5 percent correct from 1976-77 to 1977-78, an increase which translated into a gain of 1 percentile point on national norms. The median third grade pupil now ranks at the 57th percentile, 7 percentile points above the national average.

Sixth grade reading scores also registered an increase (0.4 percent correct) from 1976-77 to 1977-78, resulting in a gain of 2 percentile points on national norms. Thus, the median sixth grade pupil moved from the 53rd to the 55th percentile rank--5 points above the national average.

Twelfth grade reading scores declined (0.3 percent correct) from 1976-77 to 1977-78; the median twelfth grade student is scoring at the 42nd percentile--8 percentile points below the national average.

Skill Area Strengths and Weaknesses

The members of the Reading Assessment Advisory Committee reviewed the statewide 1977-78 reading results to determine strengths and weaknesses in the reading achievement of California students. While the presentation of skill-area strengths and weaknesses is based on the committee's judgments, the Department of Education accepts full responsibility for the conclusions in this report.

Second and third grade results. The members of the committee were pleased to see the continuing upward trend in second and third grade reading achievement. The pattern of strengths and weaknesses discerned by the committee in the second and third grade reading results is summarized in Figure 1.

Figure 1

Committee Judgments of Second and Third Grade Skill Area Results

Area of strength	Area in need of improvement
Identifying sound-letter correspondences	Comprehending more complex sentence structures
Identifying the meanings of common words	Understanding structural relationships between words and sentences (such as following a pronoun or other word substitute back to its referent)
Comprehending short, simple sentences presented outside a paragraph	Drawing inferences from details within a passage
Identifying explicit information stated within a single sentence embedded in a short, simple paragraph	
Recognizing the main idea of a short, simple paragraph	

In response to the skill area needs presented in Figure 1, the committee suggested the following instructional emphases:

- The meaning of conjunctions (such as *and*, *or*, *but*, and *as*) in the context of a sentence
- The relationships between words in complex sentences
- The relationship between a pronoun (or other word substitute) and the word it refers to in sentences and paragraphs

Some members of the committee expressed concern over the slight decline registered in spelling patterns at the third grade. They endorsed the following recommendation, which was made by the English Language Assessment Advisory Committee as a key strategy for improving both spelling and reading performance at the elementary level:

- Spelling should be taught systematically so that children are exposed to groups of words which follow similar regular spelling patterns. If spelling is taught in this orderly and structured way, pupils are more likely to internalize generalizations which apply to large groups of words. On the other hand, if children are exposed only to random lists of words and spelling demons, it will be much more difficult for them to discover the orderly nature of the English spelling system.

Sixth grade results. The members of the Reading Assessment Advisory Committee were pleased to see the gains registered on the overall sixth grade reading results and in all the reading skill areas from 1976-77 to 1977-78. The strengths and weaknesses discerned by the committee in the sixth grade reading results are presented in Figure 2.

Figure 2

Committee Judgments of Sixth Grade Skill Area Results

Area of strength	Area in need of improvement
Identifying explicit details within a passage	Recognizing word meanings
Recognizing the main idea of a relatively easy paragraph	Comprehending more complex sentence structures
	Understanding structural relationships between words and sentences (such as following a pronoun or other word substitute back to its referent)

The committee members concluded their analysis by recommending that the following language skills receive increased instructional emphasis:

- Word study and vocabulary development (including word-forming skills involving the spelling, meaning, and use of words based on roots, prefixes, and suffixes)
- Location of an idea within one or more sentence structures (including the relationship between an appositive and its referent and the relationship between a pronoun and its referent)

The committee suggested that one very good instructional strategy for fostering the above skills is the sustained discussion and close examination of the language and detail of single selections read in class. Such sustained discussion of reading material should also provide students with the opportunity to manipulate, interrelate, and evaluate ideas--skills needed for the higher level thinking processes involved in interpretive-critical comprehension.

Twelfth grade results. Members of the Reading Assessment Advisory Committee were disappointed to see a second year of declining twelfth grade reading scores. In their analysis of the test results, the members noticed a pattern which paralleled a number of points from the analyses of the grade six reading test results and the grade twelve written expression test results. This pattern of strengths and weaknesses is summarized in Figure 3.

Figure 3

Committee Judgments of Twelfth Grade Skill Area Results

Area of strength	Area in need of improvement
Identifying isolated facts and details in a variety of academic and everyday reading materials	Recognizing word meanings
Recognizing the main idea of a paragraph	Understanding structural relationships between words and sentences (such as following a pronoun or other word substitute back to its referent)
	Drawing conclusions from details within a passage
	Detecting the author's attitude

The advisory committee concluded that the continuing decline in twelfth grade reading scores, especially in contrast to this year's increase in written expression, demonstrates the need for direct reading instruction at the high school level in English classes. This instruction should be reinforced by attention to reading skills in all the content areas. Guided by an understanding of twelfth graders' strengths and weaknesses as highlighted above, members of the committee suggested the following instructional emphases:

- Word-forming skills involving the spelling, meaning, and use of words based on roots, prefixes, and suffixes
- Vocabulary development in all the content areas
- The multiple meanings and connotations of words
- Use of careful word choices to reveal feelings and attitudes and to create special effects
- Use of context for deciphering word meanings
- Relationships between words within sentences and paragraphs (such as relating a pronoun to its referent and relating a prepositional phrase to the word it modifies)

The committee recommended wide reading as the most effective method for helping students to increase their vocabulary and improve their comprehension skills. In addition, the committee recommended the sustained discussion of reading materials as a productive teaching strategy. Such discussions focussing on the details of word, sentence, and paragraph meaning are essential to the development of both vocabulary and comprehension skills.

Reading Results for Grades Two and Three

Test Scope

The Reading Test: Second and Third Grades is the instrument developed specifically to assess reading achievement at the end of the second and third grades in California's elementary schools. It was designed to assess the students' attainment of a wide variety of objectives discussed broadly in Framework in Reading for the Elementary and Secondary Schools of California (Sacramento: California State Department of Education, 1973) and specified, with the help of the Reading Assessment Advisory Committee, in Test Content Specifications for California State Reading Tests (Sacramento, California State Department of Education, 1975). Both the objectives and the 250 test items that were used to assess them fall into one of six major skill areas: phonetic analysis, structural analysis, vocabulary, literal comprehension, interpretive-critical comprehension, or study-locational.

Comparison of 1974-75, 1975-76, 1976-77, and 1977-78 Results, Grades Two and Three

A summary of the results of second grade performance on the total reading test and in each of the major skill areas for 1974-75, 1975-76, 1976-77, and 1977-78 is shown in Table 2. Changes in performance from year to year are also presented in Table 2.

The following observations about changes in second grade reading achievement are evident from an examination of the data in Table 2.

- For the third consecutive year, second grade reading scores improved on the Reading Test. The gain from 1976-77 to 1977-78 was 0.5 percent correct, resulting in an overall gain of 1.3 percent correct since 1974-75.

- From 1976-77 to 1977-78 gains were shown in all reading skill areas. The greatest of these (1.5 percent correct) occurred in the study-locational skill area involving questions which required students to alphabetize words and use a table of contents.

The results of third grade reading achievement for 1974-75, 1975-76, 1976-77, and 1977-78 are shown in Table 3. As was the case for grade two, changes in performance from year to year are presented in Table 3.

Table 2

Statewide Summary of Grade Two Reading Test Results for 1974-75, 1975-76, 1976-77, and 1977-78

Skill area	Number of questions	Average percent correct				Change		
		1974-75	1975-76	1976-77	1977-78	1974-75 to 1975-76	1975-76 to 1976-77	1976-77 to 1977-78
TOTAL READING	250	67.6	67.7	68.4	68.9	+0.1	+0.7	+0.5
Word Identification	60	75.4	75.5	76.2	76.5	+0.1	+0.7	+0.3
Sight words	5	83.9	84.5	85.4	85.9	+0.6	+0.9	+0.5
Phonetic analysis	45	76.5	76.5	77.1	77.4	-0-	+0.6	+0.3
Structural analysis	10	65.8	66.3	67.5	67.9	+0.5	+1.2	+0.4
Vocabulary	60	67.7	67.6	68.6	69.1	-0.1	+1.0	+0.5
Comprehension	110	61.3	61.3	62.4	62.8	-0-	+1.1	+0.4
Literal	77	62.5	62.3	63.4	63.8	-0.2	+1.1	+0.4
Interpretive	33	58.7	59.1	60.0	60.4	+0.4	+0.9	+0.4
Study-Locational	20	75.5	77.2	77.9	79.4	+1.7	+0.7	+1.5

Table 3

Statewide Summary of Grade Three Reading Test Results for 1974-75, 1975-76, 1976-77, and 1977-78

Skill area	Number of questions	Average percent correct				Change		
		1974-75	1975-76	1976-77	1977-78	1974-75 to 1975-76	1975-76 to 1976-77	1976-77 to 1977-78
TOTAL READING	250	81.3	81.4	81.7	82.2	+0.1	+0.3	+0.5
Word Identification	60	85.8	85.6	85.9	86.3	-0.2	+0.3	+0.4
Sight words	5	92.7	92.6	92.9	93.5	-0.1	+0.3	+0.6
Phonetic analysis	45	86.1	85.9	86.2	86.5	-0.2	+0.3	+0.3
Structural analysis	10	80.9	80.8	81.1	81.8	-0.1	+0.3	+0.7
Vocabulary	60	82.6	82.9	83.4	83.9	+0.3	+0.5	+0.5
Comprehension	110	77.0	76.7	77.1	77.6	-0.3	+0.4	+0.5
Literal	77	77.9	77.5	78.0	78.5	-0.4	+0.5	+0.5
Interpretive	33	74.9	74.9	75.0	75.5	-0-	+0.1	+0.5
Study-Locational	20	88.0	88.0	88.8	89.6	-0-	+0.8	+0.8

The following conclusions about changes in third grade reading performance (which are highly consistent with those for the second grade) are apparent from the results in Table 3.

- For the third consecutive year, third grade reading achievement improved--by 0.5 percent in the last year. Added to the previous gains, this year's increase resulted in an overall gain of 0.9 percent correct since the first administration of the Reading Test in 1974-75.

- From 1976-77 to 1977-78 gains were registered in all reading skills areas. The largest gain occurred in the study-locational skill area (0.8 percent).

Analysis and Interpretation of Skill Area Results, Grades Two and Three

Members of the Reading Assessment Advisory Committee analyzed, interpreted, and evaluated the 1977-78 reading results. In this process they weighed such factors as the inherent difficulty of the skills, the particular items used to assess each skill, and changes in performance since 1974-75. Guided by an understanding of the kinds of errors pupils were making, the committee members concluded their analyses with implications for instruction.

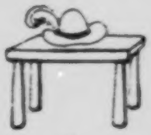
Literal comprehension. The Reading Test is designed to measure two broad categories of reading comprehension. The first of these, literal comprehension, is defined as the locating or remembering of explicit elements stated in written material. Thus, the 77 literal comprehension questions required second and third graders to identify the meaning of words, sentences, and short paragraphs.

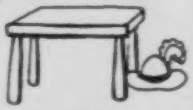
Members of the committee observed that scores were extremely high on a cluster of questions that required students to identify the meaning of an isolated sentence.

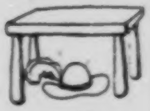
The scores on the following test item were typical of both second and third grade performance on the sentence comprehension questions:

Example A

The hat is under the table.







	○	○	●
Grade 2	(11)	(1)	(88)
Grade 3	(3)	(1)	(96)

The data on this question and others like it suggest that the vast majority of second and third graders have learned to read short, simple, isolated sentences composed of easily decodable words. However, when literal questions were based upon sentences contained within paragraphs (as is the case with most of the literal questions), performance levels were somewhat lower. Example B illustrates average performance in the literal comprehension category for both grades two and three.

Example B

Read the story and answer the questions.

Susan had a dream. She dreamed she was a grocer. Her store was just like a real store, but she was a strange grocer. She did not sell her groceries. She gave them away. The people thanked Susan by giving her tickets to the movies. Soon she had many tickets, and she took many boys and girls to the movies.

The people thanked Susan by

	Grade 2	Grade 3
○ saying "Thank you."	(26)	(16)
● giving her tickets.	(64)	(79)
○ giving her flowers.	(10)	(5)

In Example B choosing the correct answer required (1) locating the key sentence (underlined here for the reader's convenience); and (2) identifying among the choices the answer that was given verbatim in the underlined sentence. While this question is still a test of sentence comprehension (like Example A) a good deal of difficulty is added evidently once that sentence is embedded in a paragraph. On this more difficult item, almost two-thirds of the second graders and just over three-fourths of the third graders responded correctly, as the data reveal. Thus, it appears that a majority of second and third graders are able to handle the very basic, rote, verbatim kinds of literal comprehension questions derived from a sentence within a short, simple paragraph.

Members of the committee observed that additional difficulty arises when pupils are required to draw relationships between words in a sentence, or between sentences in a paragraph. Consider, for example, the following passage which contains all the information needed to answer the question (underlined here for the reader's convenience).

Example C

Read the story and answer the questions.

Father and Mother Seal lived in the cold North. They had a "puppy," as a baby seal is called. The seal family lived

on a big iceberg with cold water all around them. Mother Seal went down into the water to catch fish. Father Seal did not fish. He lived on the fat under his skin. Mother Seal taught her puppy to swim so he could catch his own food.

In this story, the puppy is a little

	Grade 2	Grade 3
○ dog.	(38)	(22)
○ fish.	(8)	(4)
● seal.	(54)	(74)

To find the answer in this item, however, pupils must relate "puppy" and "baby seal" by use of the conjunction "as," an operation that involves an understanding of a slightly more complex sentence structure. Over one-fourth of the third graders and almost one half of the second graders failed to demonstrate this understanding. Thus, members of the committee concluded that primary grade students need specific instruction in the meaning of conjunctions and the relationships between words in more complex sentence structures to ensure that pupils learn to derive meaning from context clues as in Example C.

A test item that required students to relate the words from one sentence to those in another sentence is shown as Example D:

Example D

Read the story and answer the questions.

Did you ever see a mouse that could fly? A bat is sometimes called a flying mouse.

A bat is a furry animal. It has no feathers. Instead, its wings are made from skin. The skin stretches from the tips of its front legs to the tips of its back legs.

Some bats are as tiny as mice. Others can spread their wings nearly as wide as an eagle can.

A bat is not like flying fish or flying squirrels. Those animals glide only a little way. But a bat is like birds and some insects. It can stay up in the air as long as it wants to.

Flying squirrels can

	Grade 2	Grade 3
○ glide as long as they want.	(17)	(15)
● glide only a little way.	(50)	(64)
○ fly like birds.	(19)	(11)
○ fly like bats.	(14)	(10)

To find the answer in this item, the pupils had to put together two sentences (underlined here for the reader's convenience), a process that involved following "Those animals" back to "flying fish and flying squirrels." As is apparant from the data, one-half of the second graders and over one-third of the third graders failed to accomplish this task. Thus, on the basis of scores on this question and others like it, members of the committee concluded that students would profit by more specific instruction and practice in recognizing the relationship between a pronoun or other word substitute and its antecedent.

Interpretive-critical comprehension. Interpretive-critical comprehension is the second and higher level of reading comprehension that the Reading Test is designed to assess. Items in this area required the reader to use the explicit information in the reading material to reach a conclusion not stated in the material. Thus, the 33 interpretive-critical comprehension questions required pupils to make judgments, predict outcomes, infer main ideas, or draw some other kind of inference.

Example E is one of the test items used to assess performance in this skill area:

Example E

Read the story and answer the questions.

Once there was a little boy who had a big problem. Every time the boy tried to talk his words came out backwards. No one could understand what he was saying!

The little boy's parents took him to the best doctors in the country. The doctors could find no way to help the little boy.

One night the little boy had a dream. He dreamed that if he walked backwards people would understand what he was saying.

When he awoke the next morning he decided to see if his dream would come true. He walked backward to the kitchen. He spoke to his mother and father. Guess what? They could understand him!

At the end of the story the little boy probably felt

	Grade 2	Grade 3
● happy.	(71)	(85)
○ unhappy.	(15)	(6)
○ angry.	(4)	(3)
○ sad.	(10)	(6)

To find the correct answer in the above question, the pupils had to (1) comprehend the story; and (2) infer how the outcome of the events would make the little boy feel. Thus, the item was a discriminating test of their overall comprehension of the passage. As the item data reveal, 71 percent of the second graders and 85 percent of the third graders handled this question successfully.

While Example E required an understanding of the overall meaning of the story, the following test question required pupils to draw a conclusion from a piece of information presented within the paragraph.

Example F

Read the story and answer the questions.

Most people believe that earthworms are of little use except for fish bait. But scientists have found that they are very important. Earthworms eat soil. They make the soil better by grinding it up as it passes through their bodies. The holes that earthworms make as they burrow in the earth make it easier for the roots of plants to enter the soil. Earthworms use leaves to line their underground homes. These leaves make the soil richer. Scientists have found that earthworms are the earth's plowmen. They keep stiring up the soil which helps to raise better crops.

Earthworms should have no trouble finding

	Grade 2	Grade 3
○ company.	(10)	(7)
○ crops.	(24)	(19)
● food.	(56)	(67)
○ fishermen.	(10)	(7)

Scores dropped considerably from Example E to Example F. These items illustrate a pattern that occurred in inferential comprehension at other grade levels as well; namely, that pupils seem to have less difficulty recognizing the overall meaning of a passage than they do inferring conclusions from details within a passage. A similar finding was also reported by the National Assessment of Educational Progress.

Summary of Committee's Observations, Conclusions, and Recommendations

Members of the Reading Assessment Advisory Committee were gratified to see another year of improved reading achievement scores at the second and third grade levels. In the process of reviewing the second and third grade results item by item, the committee members reached the following conclusions:

1. The vast majority of second and third graders can identify the meaning of short, isolated sentences composed of easily decodable words (Example A). This was not unexpected since second and third grade performance on the relatively easy word identification and vocabulary questions was quite strong.

2. A majority of second and third graders can locate and identify explicit information stated within a single sentence embedded in a short, simple paragraph (Example B). The major obstacles to higher literal comprehension scores appear to be difficulties with more complex sentence structures and intersentence relationships (Examples C and D).

3. Second and third grade pupils seem to have less difficulty recognizing the overall meaning of a passage than they do drawing inferences from details within a passage (Examples E and F).

After investigating the kinds of errors that pupils are making, members of the committee recommended the following be emphasized in instruction:

- The meaning of conjunctions (such as and, or, but, and as) in the context of a sentence
- The relationships between words in complex sentences
- The relationship between a pronoun (or other word substitute) and the word it refers to in sentences and paragraphs

Some members of the committee expressed concern over the slight decline registered in spelling patterns at the third grade. They endorsed the following recommendation, which was made by the English Language Assessment Advisory Committee as a key strategy for improving both spelling and reading performance at the elementary level:

- Spelling should be taught systematically so that children are exposed to groups of words which follow similar regular spelling patterns. If spelling is taught in this orderly and structured way, pupils are more likely to internalize generalizations which apply to large groups of words. On the other hand, if children are exposed only to random lists of words and spelling demons, it will be much more difficult for them to discover the orderly nature of the English spelling system.

Reading Results for Grade Six

Test Scope

The reading section of the Survey of Basic Skills: Grade 6 consisted of 128 questions. The items were selected to assess the students' attainment of a wide variety of objectives discussed broadly in Framework in Reading for the Elementary and Secondary Schools of California (Sacramento: California State Department of Education, 1973) and specified, with the help of the Reading Assessment Advisory Committee, in Test Content Specifications for California State Reading Tests (Sacramento: California State Department of Education, 1975). Both the objectives and the questions used to assess them fall into one of five major skill areas: word identification, vocabulary, literal comprehension, interpretive-critical comprehension, and study-locational skills. The emphasis assigned to each of the reading skill areas in the Survey of Basic Skills: Grade 6 is presented graphically in Figure 4.

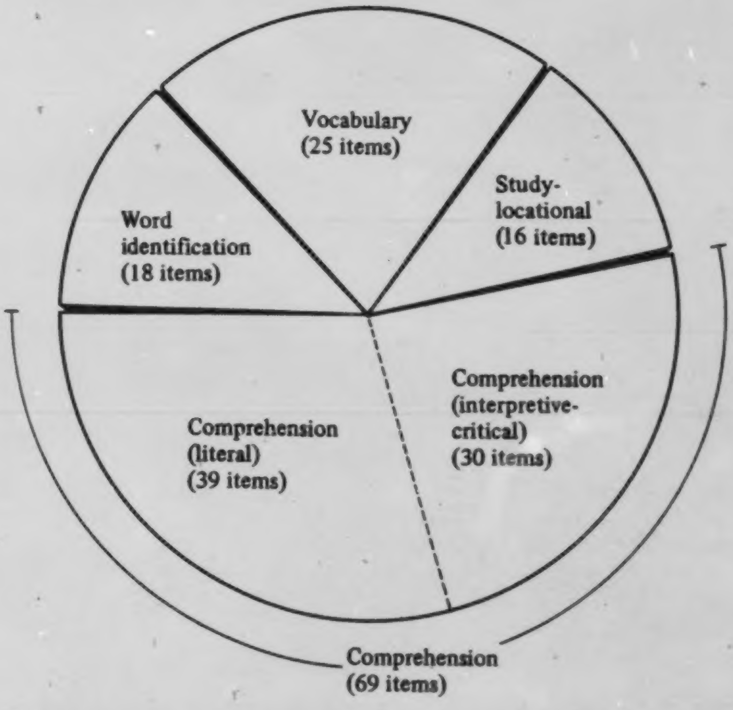


Fig. 4. Number of questions, by skill area, in the reading portion of the *Survey of Basic Skills: Grade 6*

Comparison of 1975-76, 1976-77, and 1977-78 Results, Grade Six

The results of sixth grade performance on the total reading test and in each of the skill areas for 1975-76, 1976-77, and 1977-78 are presented in Table 4. Year-to-year changes in overall performance and in skill area performance are also shown in the table.

Table 4

Reading Performance of California Sixth Grade Students
on the Survey of Basic Skills: Grade 6

Skill area	Number of questions	Average percent correct			Change	
		1975-76	1976-77	1977-78	1975-76 to 1976-77	1976-77 to 1977-78
READING, TOTAL	128	66.1	65.9	66.3	-0.2	+0.4
Word identification	18	74.3	74.2	74.7	-0.1	+0.5
Vocabulary	25	67.1	66.3	66.9	-0.8	+0.6
Comprehension	69	64.9	64.9	65.2	-0-	+0.3
Literal	39	67.4	67.2	67.5	-0.2	+0.3
Interpretive-critical	30	61.8	62.0	62.2	+0.2	+0.2
Study-locational	16	60.0	59.8	60.5	-0.2	+0.7

The following observations about changes in achievement are evident from an examination of the data in Table 4:

- From the spring of 1977 to the spring of 1978, sixth grade reading test scores improved by 0.4 percent correct. This increase was twice as large as the decrease (0.2 percent correct) shown from the spring of 1976 to the spring of 1977, thus yielding an overall increase of 0.2 percent correct for the two-year period from 1975-76 to 1977-78.

- From the spring of 1977 to the spring of 1978, increases were registered in all reading skill areas, the largest of which occurred in study-locational skills (0.7 percent correct).

Analysis and Interpretation of Skill Area Results, Grade Six

The members of the Reading Assessment Advisory Committee analyzed, interpreted, and evaluated the 1977-78 reading results. In this process they considered such factors as the inherent difficulty of the skills, the particular items used to assess each skill, and changes in performance since 1975-76. Guided by an understanding of the typical errors made by sixth graders, members of the committee concluded their analysis with instructional recommendations.

Word identification. Most of the word identification questions on the Survey of Basic Skills: Grade 6 were written to measure students' knowledge of suffixes, roots, and prefixes. Members of the Reading Assessment Advisory Committee have stressed in past reports the importance of teaching these skills as key building blocks to reading comprehension (see the 1975-76 and 1976-77 annual reports of Student Achievement in California Schools). Therefore, members of the committee were pleased to see the improvement shown in this skill area from the spring of 1977 to the spring of 1978. However, committee members were still not satisfied with the proportions of students responding correctly on these questions. They expected, for example, nearly all of the sixth graders to recognize the meaning of the prefix un on the following question rather than the 73 percent that did so:

Example A

The toga was a loose outer garment worn by Roman citizens when they appeared in public. It was made of a single broad piece of undyed woolen cloth, usually cut in the shape of a semicircle. A large toga might contain from 10 to 20 square yards of cloth. The toga was draped about the body with the straight side thrown over the left shoulder. The help of a servant, and sometimes of more than one, was required to drape a large toga artfully. It was heavy and hot, and did not permit freedom of movement.

Togas were usually white in color. Some men, especially candidates for public office, had the cloth bleached to make it extra white. On festive occasions army generals and certain public officials wore red or purple togas embroidered with gold thread. A Roman boy wore a purple-bordered toga until sometime between the ages of 12 and 16, when he put away the toga of childhood and put on the plain white toga of manhood.

We know from the prefix un in the word undyed that the woolen cloth was

(7) ○ dyed apart.
(7) ○ dyed back.
(13) ○ dyed over again.
(73) ● not dyed.

The committee concluded from the percent correct scores on questions such as this one that more emphasis is needed throughout the elementary grades on basic word-building skills (such as recognizing the meaning, use, and spelling of words with prefixes and suffixes). This judgment was corroborated by the members of the English Language Assessment Advisory Committee in their analysis of sixth grade written expression and spelling results (see pages 52-53).

Vocabulary. The 25 vocabulary questions on the sixth grade reading test required students to identify the meanings of words as they were used in a paragraph. Members of the committee were pleased to see the improvement in scores from 1976-77 to 1977-78. However, they judged that performance in this area should still be higher. For example, fewer than three-fourths of the sixth graders demonstrated an understanding of the common word skeleton in the following item:

Example B

(1) What we usually call "sponges" are really only the dry skeletons of sponges. In life these were filled in and all covered over with the soft jelly-like flesh of living cells. When the live sponges are taken from the bottom of the ocean, they look like pieces of beef liver.

(2) Although classed as animals, sponges are like plants in many ways. They are always fastened to some object and never move about. They do not have eyes, or legs, or many of the other organs that animals usually have. Yet, sponges use the same method of feeding as animals, and also have the same type of egg cells.

(3) Some sponges live attached to other animals such as crabs. Fresh-water sponges live mostly on the underside of stones and floating objects. But it often happens that other animals make their homes in sponges. Sponges are never eaten by other animals, probably because sponges have a very disagreeable odor.

(4) Sponges are easily prepared for the market. It takes about three days for the flesh to decay away, and the skeletons are easily washed and cleaned. With a little trimming and sorting they are ready to be sold. Once widely bought, natural sponges have been largely replaced now by the factory-made cellulose "sponges," which come in many pretty colors. People use both kinds of sponges for washing windows, washing cars, and soaking up spilled liquids. And sometimes a sponge is used instead of a washcloth in bathing.

The word skeleton means:

(72) ● an animal's bones
(12) ○ an animal's egg cells
(5) ○ an animal's home
(11) ○ an animal's cellulose

Some members of the committee were disappointed that the percent of students responding correctly on this item was so low.

Furthermore, committee members observed low scores on some comprehension questions which were designed to assess knowledge of word meanings. The following is an example:

Example C

The toga was a loose outer garment worn by Roman citizens when they appeared in public. It was made of a single broad piece of undyed woolen cloth, usually cut in the shape of a semicircle. A large toga might contain from 10 to 20 square yards of cloth. The toga was draped about the body with the straight side thrown over the left shoulder. The help of a servant, and sometimes of more than one, was required to drape a large toga artfully. It was heavy and hot, and did not permit freedom of movement.

Togas were usually white in color. Some men, especially candidates for public office, had the cloth bleached to make it extra white. On festive occasions army generals and certain public officials wore red or purple togas embroidered with gold thread. A Roman boy wore a purple-bordered toga until sometime between the ages of 12 and 16, when he put away the toga of childhood and put on the plain white toga of manhood.

Red togas were worn

(26) ○ between the ages of 12 and 16.
(36) ● for celebrations.
(12) ○ during childhood.
(26) ○ when officials embroidered them.

Careful study of Example C reveals that the question was based on one sentence (underlined here for the reader's convenience). Arriving at the correct answer required understanding the meaning of "festive occasions." Probably a lack of vocabulary knowledge hindered many students in their performance on this item. Thus, sixth grade achievement on a variety of vocabulary and comprehension questions led the committee to conclude that more intensive work in word study and vocabulary development is needed to ensure maximal growth for elementary pupils in reading comprehension.

Committee members were even more concerned about the number of students who failed to make use of obvious and explicit context clues in deciphering word meanings, as in the following example:

Example D

Can bees see colors? If they can, color vision is probably useful to them. If bees can see colors, they probably find flowers more easily. Bees fly from flower to flower gathering nectar, a sweet substance used in making honey. In the process they transfer pollen from flower to flower. If it were not for the pollinating process, plants couldn't make seeds.

To find out if bees can see color, some investigators placed two squares of paper—one blue and one green—in the bottom of a cage of bees. They set a tiny dish on each square. They filled the dish on the blue square with a solution of sugar and water and left the dish on the green square empty.

At first the bees landed on both squares. But soon they were all clustered on the blue square, feeding on the sugar water. After a while the investigators emptied the dish of sugar water but left the dish in the cage. The bees still landed only on the blue square. Even when the squares were moved to different places in the cage, the bees went to the blue square.

The investigators knew, however, that many animals can't see color; they see things only in different shades of gray. Perhaps the bees could tell the squares apart because they saw green and blue as different shades of gray. The investigators replaced the green square with many gray squares, each a different shade. On each gray square they put an empty dish; on the one blue square they also put an empty dish. As before, the bees landed only on the blue square.

The word nectar means:

(77)● a sweet substance
(10)○ honey
(11)○ pollen
(2)○ seeds

Some members of the committee speculated that many students who missed this item may have been confused by the sentence structure since the context clue was presented as an appositive. The committee members concluded that specific instruction in understanding more complex sentence structures is likely to be an important strategy for helping children learn to take advantage of context clues.

Literal comprehension. The *Survey* is composed of two broad categories of reading comprehension questions. The first category, literal comprehension, is defined as identifying or remembering explicitly stated elements in the material read. Most literal comprehension items asked students to identify a single fact presented in the reading material, and several of these required fairly close reading and careful discriminations. Members of the committee observed that most students did very well on basic, straight-forward, literal questions dealing with isolated details, as in the following example:

Example E

A new kind of star is shining over New York City. It is at the top of a tall, steel tower on an office building. It can be seen from a distance of five miles and tells by changing its color what kind of weather New York City is going to have. Clear weather is coming if the star is green. Orange means the weather will be cloudy. If the star is flashing orange, New York children wear rubbers and raincoats because rain is on the way. When the star is flashing white, snow is on the way and children get out their sleds. This is the most modern way to predict what the weather is going to be. For a long time radio and newspapers were the principal sources of information concerning the weather. Now a new way has been found.

How would you like to have a star tell you when you can go on your picnic? Maybe the star will tell you the weather is unsuitable and you will have to eat your picnic lunch inside.

A green star shining atop the building means

(4) ○ children should wear their boots.
(2) ○ snow.
(91) ● clear weather.
(3) ○ children should get out their sleds.

All of the information needed to answer this question is contained within a single sentence (underlined in the passage for the reader's convenience). However, the following question, based upon the same passage, proved to be more difficult:

Example F

What can be seen from a distance of five miles?

(6) ○ New York City
(13) ○ A steel tower
(5) ○ An office building
(76) ● A new kind of star

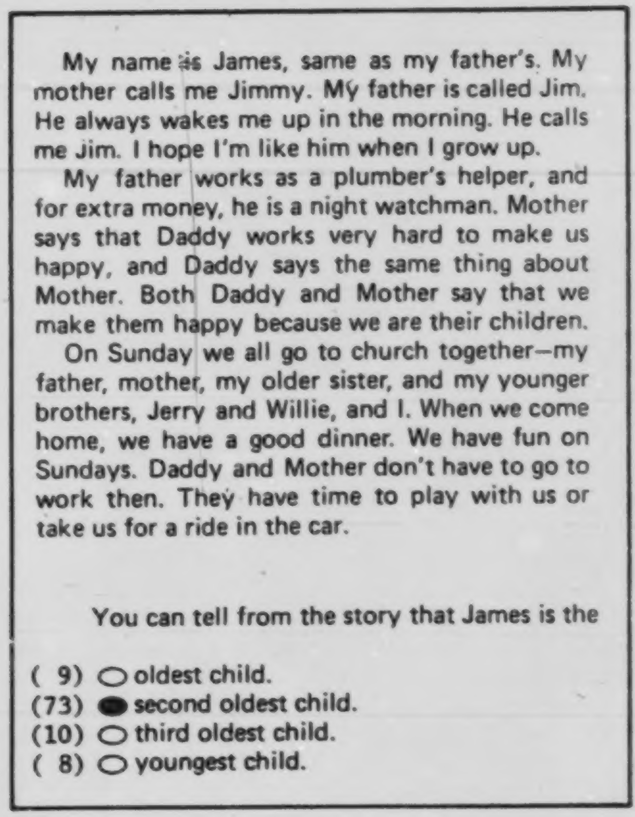
This question was derived from the first three sentences of the passage shown in Example E. The literal comprehension task in this item involved relating the word "It" in the third sentence to its referent, "A new kind of star," in the first sentence. Thus, while over 90 percent of the students were able to answer successfully the question in Example E, which was based upon one sentence, only about three-fourths of the students successfully related words from sentence to sentence in Example F. Thus, some committee members concluded that more intensive and specific instruction in helping students understand and follow relationships between words (as from the pronoun to its referent in Example F) is a key strategy for improving comprehension on almost all reading materials which involve conventional paragraph development.

The committee felt that one of the best instructional strategies for accomplishing this purpose is the sustained discussion of details and their relationships within reading material. In this sort of discussion, students might learn to focus on those cues essential to comprehending all written English.

Interpretive-critical comprehension. The second broad category of comprehension questions appearing on the Survey is a higher level of reading skill: interpretive-critical (or inferential) comprehension. In interpretive-critical comprehension, a reader uses the explicit information in a passage along with his or her personal experiences and thinking abilities to predict, generalize, compare, judge, infer, and create ideas. Thus, the 30 interpretive-critical comprehension questions on the Survey required students to glean from a passage some conclusion that was not explicitly stated. As one might expect, the questions in this skill area were more difficult for students than those in any of the foregoing skill areas. The average percent correct in this area was 62.2.

Since sixth graders have shown slight increases for two consecutive years in this typically difficult skill area, members of the committee were generally pleased by the results. The following test item is an illustration of the type of skill being assessed in the area of interpretive-critical comprehension:

Example G



My name is James, same as my father's. My mother calls me Jimmy. My father is called Jim. He always wakes me up in the morning. He calls me Jim. I hope I'm like him when I grow up.

My father works as a plumber's helper, and for extra money, he is a night watchman. Mother says that Daddy works very hard to make us happy, and Daddy says the same thing about Mother. Both Daddy and Mother say that we make them happy because we are their children.

On Sunday we all go to church together—my father, mother, my older sister, and my younger brothers, Jerry and Willie, and I. When we come home, we have a good dinner. We have fun on Sundays. Daddy and Mother don't have to go to work then. They have time to play with us or take us for a ride in the car.

You can tell from the story that James is the

(9) ○ oldest child.
(73) ● second oldest child.
(10) ○ third oldest child.
(8) ○ youngest child.

Members of the committee concluded that the sustained discussion of reading material in class is likely to be profitable in terms of interpretive-critical comprehension as well as literal comprehension. Such instruction would provide students with the opportunity to manipulate, interrelate, and evaluate ideas.

Summary of Committee's Conclusions and Recommendations

The members of the Reading Assessment Advisory Committee were pleased to see the gains registered on the overall sixth grade reading results and in all the reading skill areas from 1976-77 to 1977-78. They were especially pleased with the gains made for two consecutive years on the questions assessing the higher level reading skills, interpretive-critical comprehension.

They observed that most sixth graders can perform successfully on very basic, straight-forward, literal questions dealing with isolated details and main ideas based upon relatively easy material. Performance starts to drop off as soon as the questions begin to place demands upon students' knowledge of word meanings, understanding of more complex sentence structures, and ability to follow the relationships between words and sentences.

After reviewing the kinds of errors made by sixth graders on the reading test, members of the committee identified the following language skills as critical areas in need of more specific instructional emphasis because they are key building blocks to the mastery of reading and writing skills:

- Word study and vocabulary development (including word-forming skills involving the spelling, meaning, and use of words based upon roots, prefixes, and suffixes)
- Location of an idea within one or more sentence structures (including the relationship between an appositive and its referent--see Example D--and the relationship between a pronoun and its referent--see Example E)

Members of the committee added that recent research findings suggest that one very good instructional strategy for fostering the above skills is the sustained discussion and close examination of the language and detail of single selections read in class. Such sustained discussion of reading material should also provide students with the opportunity to manipulate, interrelate, and evaluate ideas--skills needed for the higher level thinking processes involved in interpretive-critical comprehension.

Reading Results for Grade Twelve

Test Scope

The reading section of the Survey of Basic Skills: Grade 12 consisted of 141 questions. The items were designed to assess the students' attainment of a wide range of objectives discussed broadly in Framework in Reading for the Elementary and Secondary Schools of California and specified, with the help of the Reading Assessment Advisory Committee, in Test Content Specifications for California State Reading Tests. As shown in Figure 2, both the objectives and the questions used to assess the achievement of the objectives fall into one of four reading skill areas: vocabulary, literal comprehension, interpretive-critical comprehension, and study-locational skills. Figure 5 is also an illustration of the emphasis placed on each of the reading skill areas in the Survey of Basic Skills: Grade 12.

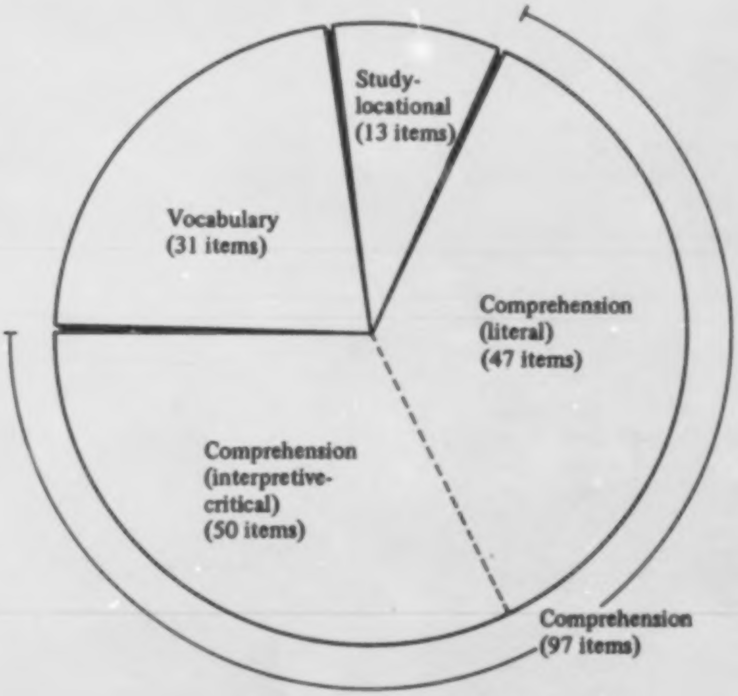


Fig. 5. Number of questions, by skill area, in the reading portion of the *Survey of Basic Skills: Grade 12*

Comparison of 1975-76, 1976-77, and 1977-78 Results, Grade 12

The results of twelfth grade performance on the total reading test and in each of the skill areas for 1975-76, 1976-77, and 1977-78 are presented in Table 5. Year-to-year changes in overall performance and in skill area performance are also shown in the same table.

Table 5

Reading Performance of California Twelfth Grade Students on the Survey of Basic Skills, Grade 12

Skill area	Number of questions	Average percent correct			Change	
		1975-76	1976-77	1977-78	1975-76 to 1976-77	1976-77 to 1977-78
READING, TOTAL	141	64.1	63.6	63.3	-0.5	-0.3
Vocabulary	31	61.3	60.9	60.5	-0.4	-0.4
Comprehension	97	64.5	63.9	63.7	-0.6	-0.2
Literal	47	69.2	68.9	68.5	-0.3	-0.4
Interpretive-critical	50	60.1	59.3	59.2	-0.8	-0.1
Study-locational	13	68.4	67.2	67.3	-1.2	+0.1

The following observations about the changes in twelfth grade reading achievement are evident from an examination of the data in Table 5:

- For the second consecutive year, twelfth grade reading achievement declined. The decrease from 1976-77 to 1977-78 (0.3 percent) was slightly less than the decrease of the previous year (0.5 percent), yielding an overall decline of 0.8 percent correct.

- From 1976-77 to 1977-78, slight declines were registered in all reading skill areas except in the area of study-locational skills, where a slight increase of 0.1 percent correct was registered.

Analysis and Interpetation of Skill Area Results, Grade 12

The members of the Reading Assessment Advisory Committee reviewed the twelfth grade results item by item as they did for the other grade levels. The committee identified some basic kinds of reading exercises that most twelfth graders performed successfully as well as some types of questions which revealed recurring patterns of difficulty. Members of the committee concluded their analysis with recommendations for reading instruction.

Literal comprehension. The first broad category of reading comprehension skills assessed by the *Survey* was literal comprehension, defined as remembering or locating elements stated explicitly in a reading selection. The 47 literal comprehension questions required students to demonstrate their understanding of what they read by selecting either a restatement or paraphrase of words, sentences or paragraphs.

A few of the literal questions on the *Survey* required students to identify an isolated fact from materials one might have to read in everyday life (such as an automobile insurance policy, a recipe, and directions for treating poison ivy). Example A is a literal comprehension test item, including the percent of students who chose each possible answer.

Example A

POISON IVY

The interval for burning, itching, and finally water-filled blisters to appear varies a great deal. This, again, may depend on some differences in human skins and the symptoms of dermatitis can develop within a few hours or even days later. The most important factor in using any remedy or treatment is TIME. Unless you can wash the poisonous sap away within 5 to 10 minutes after exposure, you are likely to be in trouble. Wash the entire body at once with any bland soap and then change clothing which must be laundered before being worn again. It is, of course, very obvious that washing is not always possible immediately after known contact with such irritating plants, and a tub or shower after outdoor activity is generally too late to avoid dermatitis if you have been exposed to or in contact with poison ivy. The blister fluid associated with ivy poisoning does not spread the irritation; but it is the oily, poisonous resin which is transferred to other skin areas by rubbing or scratching.

There are some simple preparations for treatment of ivy poisoning. An easily prepared "remedy" can be made by using equal parts of baking soda and cornstarch with enough water to form a paste or a lotion. Wet packs of boric acid are helpful in case of severely poisoned eyelids and swollen eyes. Calamine lotion can be used to soothe the discomfort of itching, burning skin. Preparations containing iron salts are likely to cause permanent tattoo effects, especially if skin in the area of application is broken.

What should you do if the ivy poisoning affects your eyelids?

(6) ○Apply calamine lotion.
(1) ○Apply iron salt solution.
(2) ○Apply mild soap solution.
(84) ●Apply wet packs of boric acid solution.
(7) ○Apply a paste of baking soda and cornstarch.

Similarly, 90 percent of the students identified the length of baking time from a recipe, 85 percent determined the method of cooking from the same recipe and 94 percent found the maximum amount per person for which an insurance policy would cover medical bills. Moreover, on the majority of literal questions based upon academic materials (historical, scientific, and literary selections) scores of at least 70 percent correct were obtained. Thus, members of the committee concluded that most twelfth graders can perform successfully on literal questions requiring them to locate isolated facts or details from everyday and academic reading materials.

In the further examination of questions with low percent correct scores, some members of the committee observed that a weak grasp of vocabulary appeared to be a source of difficulty for many twelfth graders (as it was for sixth graders). For example, the following item in Example B reveals that over one-half of the students did not understand the meaning of the word "famished" in this passage.

Example B

I Skiing has recently become one of the more popular sports in the United States. Because of its popularity, thousands of winter vacationers are flying north rather than south. In many areas, reservations are required months ahead of time.

II I discovered the accommodation shortage through an unfortunate experience. On a sunny Saturday morning I set out from Denver for the beckoning slopes of Aspen, Colorado. After passing signs for other ski areas, I finally reached my destination. Naturally I lost no time in heading for the nearest tow. After a stimulating afternoon of miscalculated stem turns I was famished. Well, one thing led to another and it must have been eight o'clock before I concerned myself with a bed for my bruised and aching bones.

III It took precisely one phone call to ascertain the lack of lodgings in the Aspen area. I had but one recourse. My auto and I started the treacherous jaunt over the pass and back toward Denver. Along the way, I went begging for a bed. Finally a jolly innkeeper took pity and for only thirty dollars a night allowed me the privilege of staying in a musty, dirty, bathless room above his tavern.

In paragraph II, "famished" means:

(2) ○ morose
(53) ○ tired
(43) ● hungry
(2) ○ hopeful

The disappointing score on Example B and on a variety of other vocabulary questions led members of the committee to conclude that students need more instruction in vocabulary development, including the multiple meanings and connotations of words, the use of context, and vocabulary in the content areas. To accomplish this, the committee added, students need to be encouraged to read widely and need to be motivated to keep learning new words.

Twelfth grade performance on the following vocabulary item, tested without a narrative context, is revealing in a different way:

Example C

Parallel to the horizon

(67) ● horizontal   ○ base (4)
(17) ○ vertical   ○ meridian (7)
(5) ○ diagonal

The scores on this question lead to two conclusions: (1) the obvious one, that over 30 percent of the twelfth graders do not know the meaning of the word horizontal; and (2) the more instructive one, that those unsure students failed to make use of the cue in the definition, the word horizon, which is the root of the word horizontal. Members of the committee recommended that the increased instructional emphasis in vocabulary development include a word-building component involving the spelling, use, and meaning of words based upon roots, suffixes, and prefixes. Members of the English Language Assessment Advisory Committee reached the same conclusion after reviewing the twelfth grade results in spelling and written expression.

Literal comprehension is more than a knowledge of word meanings, however. It also involves the ability to follow the relationships between words, relationships that are signalled by structural cues within sentences and paragraphs. For example, many twelfth graders were still displaying confusion on questions which required them to follow the relationship between a pronoun and its referent. The following question is an illustration of this difficulty:

Example D

After two weeks of unusually high-speed travel we reached Xeno, a small planet whose population, though never before visited by Earthmen, was listed as "friendly" in the *Interstellar Gazetteer.*

On stepping lightly (after all, the gravity of Xeno is scarcely more than twice that of our own moon) from our spacecraft we saw that "friendly" was an understatement. We were immediately surrounded by Frangibles of various colors, mostly pinkish or orange, who held out their "hands" to us. Imagine our surprise when their "hands" actually merged with ours as we tried to shake them!

Then, before we could stop them (how could we have stopped them?), two particularly pink Frangibles simply stepped right into two eminent scientists among our party, who immediately lit up with the same pink glow. While occupied in this way, the scientists reported afterwards, they suddenly discovered that they "knew" a great deal about Frangibles and life on Xeno.

Apparently Frangibles could take themselves apart atomically and enter right into any other substance. They communicated by thought waves, occasionally merging "heads" for greater clarity. Two Frangibles who were in love with each other would spend most of their time merged into one; they were a bluish-green color unless they were having a lovers' quarrel, when they turned gray.

How did the Frangibles communicate?

(3) ○By lighting up (9)○ By changing color
(1) ○By sign language ○ By shaking "hands"
(79) ●By thought waves (8)

A correct response on this item involves recognizing that "They" refers to the "Frangibles"; otherwise, the answer to the question is presented verbatim in one sentence (underlined here for the reader's convenience). The difficulty students are having in following such relationships between words is probably contributing to the error rate on this relatively easy item. Example E illustrates a somewhat similar kind of difficulty.

Example E

The Director of the FBI wrote an article for the March 8, 1975, issue of *TV GUIDE* that started like this:

> At 9:40 p.m. last July 24, as the House Judiciary Committee debated Presidential impeachment charges before millions of television viewers, a bomb threat came into the Capitol switchboard. The hearing room was cleared and, during the precautionary search, newspeople quite properly reported the threat to vast network audiences.
>
> A television newsman commented, somewhat stoically I thought, to the effect that "Simply by reporting it, we may well be encouraging someone else to telephone a bomb threat."
>
> The newsman was correct. Beginning that evening there were seven telephoned threats to obliterate the Committee, all apparently generated by the instant, nationwide exposure given the initial threat.

The news about the first bomb threat was reported over television

(14) ○ as the threat was being called in.
(24) ○ as the room was being cleared of people.
(56) ● during the search for the possible bomb.
(6) ○ after it had been determined that there was no bomb.

On this item students needed to recognize that the phrase "during the precautionary search" modifies the word "reported" and thus indicates that the search and the reporting were going on at the same time. The data on this question suggest that many students failed to comprehend this structural clue.

After reviewing student performance on Examples D, E, and others like them, members of the committee concluded that students need specific instruction designed to help them understand relationships between words, sentences, and paragraphs in their reading. One way to accomplish this goal is through sustained discussion that examines closely the language and detail in the material being read in class.

Interpretive-critical comprehension. A higher level reading skill, interpretive-critical comprehension is assessed by 50 questions on the Survey. In interpretive-critical comprehension, a reader uses the explicit information in the selection to make predictions, form generalizations, reach conclusions, make comparisons, form judgments, and create new ideas. All other things being equal, interpretive-critical comprehension questions should be more difficult than the purely literal because the reader is required to make inferences.

This proved to be the case on the Survey of Basic Skills: Grade 12, on which students averaged 59.2 percent correct in the interpretive-critical skill area (in contrast to 68.5 percent correct for the literal). As in the literal category, scores in interpretive-critical comprehension have declined slightly for two consecutive years.

Members of the committee observed that twelfth graders were typically more successful at drawing inferences about the main idea or entire meaning of a passage than they were at making inferences from details within a passage This pattern is illustrated by the following two test items based on the same selection:

Example F

> The thirty years from 1455 to 1485 were a period of almost constant civil war between the supporters of two branches of the royal family—the house of Lancaster and the house of York. This fighting is usually called the War of the Roses, because the house of Lancaster had a red rose as its badge, and the house of York a white rose. At the end of it, Henry Tudor, who belonged to the Lancaster branch of the family, came to the throne as Henry VII. He married Elizabeth, who belonged to the York branch, and thus helped to heal the wounds of the prolonged conflict. Its chief result was the wiping out of many noble families and the reduction of the power of these lords and barons so that a king could have his own way without much trouble.

Henry VII's reign (1485–1509) was a time of rebuilding for England. He kept order in the country and strengthened the royal power by special courts and economical management. In his reign John Cabot made his famous trip across the Atlantic—the first of modern Europeans to see the continent of North America where Columbus had reached only the Carribean Islands. Henry's economy is seen in the entry in his diary when Cabot came back: "To hym that found the new isle, £10"—less than fifty dollars for discovering a continent—but of course Henry didn't know how important this discovery was going to be in the history of England.

A conclusion that can be drawn from this passage is that

(7) ○ the position of king of England was weaker after the War of the Roses.
(3) ○ explorers were handsomely paid in the time of Henry VII.
(4) ○ Henry VII was a navigator before he became king.
(86) ● Henry VII lived in a time of conflict and exploration.

Example G

According to the passage, Henry VII ruled at the time of

(29) ○ a revolution against the nobility.
(31) ○ the settlement of New England.
(26) ● the voyages of Columbus.
(14) ○ the destruction of the house of York.

Example F required students to demonstrate an understanding of the primary message of the material; whereas Example G required them to find a detail relating to the time period in the passage, and relate it to basic historical knowledge concerning the voyages of Columbus. While 86 percent of the twelfth graders succeeded on the former task, just over one-fourth of them successfully managed the latter.

The National Assessment of Educational Progress reported a similar finding:

> . . . individuals appear to be much more capable of drawing inferences about the entire meaning of a passage than they are of making specific inferences from phrases or sentences within a passage. (Reading in America: A Perspective on Two Assessments. Reading Report No. 06-R-01, October, 1976.)

Some interpretive-critical questions required students to infer the author's attitude or purpose. The ability to answer this kind of question correctly involves being aware of the way an author chooses words to create a particular feeling toward the topic. This critical reading skill is central to identifying the mood or tone of a selection as well as to detecting propaganda devices. The following item is an illustration of this kind of reading skill:

Example H

I Skiing has recently become one of the more popular sports in the United States. Because of its popularity, thousands of winter vacationers are flying north rather than south. In many areas, reservations are required months ahead of time.

II I discovered the accommodation shortage through an unfortunate experience. On a sunny Saturday morning I set out from Denver for the beckoning slopes of Aspen, Colorado. After passing signs for other ski areas, I finally reached my destination. Naturally I lost no time in heading for the nearest tow. After a stimulating afternoon of miscalculated stem turns I was famished. Well, one thing led to another and it must have been eight o'clock before I concerned myself with a bed for my bruised and aching bones.

III It took precisely one phone call to ascertain the lack of lodgings in the Aspen area. I had but one recourse. My auto and I started the treacherous jaunt over the pass and back toward Denver. Along the way, I went begging for a bed. Finally a jolly innkeeper took pity and for only thirty dollars a night allowed me the privilege of staying in a musty, dirty, bathless room above his tavern.

The author's love for skiing is suggested in which paragraph(s)?

(11) ○ I
(44) ● II
(2) ○ III
(8) ○ I and II
(35) ○ None of the paragraphs

Key words revealing the answer to this question are underlined.

As the item data reveal, less than half of the twelfth graders answered this question correctly. The low performance on this item and others like it may be related to the declining scores in language choices at both grades six and twelve (discussed in Chapter V under "Written Expression Results for Grades Six and Twelve"). Thus, evidence from both reading and written expression test results suggests that elementary and secondary students would profit from intensified instruction in the way in which deliberate word choices in writing can reveal the author's feeling toward the topic.

Summary of Committee's Observations, Conclusions, and Recommendations

Members of the Reading Assessment Advisory Committee were disappointed to see a second year of declining twelfth grade reading scores. In their analysis of the test results, they discerned the following pattern of strengths and weaknesses (which paralleled a number of points from the analyses of the grade six reading test results and grade twelve written expression test results):

- A majority of twelfth graders can identify isolated facts and details from a variety of academic and everyday reading materials. The two major obstacles to higher literal comprehension scores appear to be (1) difficulty in recognizing word meanings in context, or through prefix, root or suffix clues (see Examples B and C) and (2) difficulty in following such structural clues as pronoun references and prepositional phrases (see Examples D and E).

- Twelfth graders are typically more successful at inferring the main idea or overall meaning of a selection than they are at drawing conclusions from details within a passage (see Examples F and G). This finding was also reported by the National Assessment of Educational Progress in a report on national reading performance.

- Many twelfth graders are not adept at detecting the ways in which authors reveal their feelings toward a topic through careful word choices (see Example H). This finding is all the more significant in light of the decline in the written expression skill area of language choices at both grades six and twelve.

The advisory committee concluded that the continuing decline in twelfth grade reading scores, especially in contrast to this year's increase in written expression, demonstrates the need for direct reading instruction at the high school level in English classes. This instruction should be reinforced by attention to reading skills in all the content areas. Guided by an understanding of twelfth graders' strengths, weaknesses, and error patterns, members of the committee suggested the following instructional emphases:

- Word-forming skills involving the spelling, meaning, and use of words based on roots, prefixes, and suffixes
- Vocabulary development in all the content areas
- The multiple meanings and connotations of words
- Use of careful word choices to reveal feelings and attitudes, and to create special effects
- Use of context for deciphering word meanings
- Relationships between words within sentences and paragraphs (such as relating a pronoun to its referent and relating a prepositional phrase to the word it modifies)

The committee recommended wide reading as the most effective method for helping students to increase their vocabulary and improve their comprehension skills. In addition, the committee recommended the sustained discussion of reading materials as a productive teaching strategy. Such discussions focussing on the details of word, sentence, and paragraph meaning are essential to the development of both vocabulary and comprehension skills.

IV. Written Expression Achievement for Grades Six and Twelve

Synopsis of Findings

Both sixth and twelfth grade written expression achievement scores in California improved slightly from 1976-77 to 1977-78. Sixth grade written expression scores have registered improvement every year since 1974-75 when the Survey of Basic Skills was first administered. From 1976-77 to 1977-78 sixth grade written expression scores again showed a slight gain (.5 percent correct). The median sixth grade student is scoring at the 51st percentile--one point above the national average.

Between 1969-70 and 1974-75 the median twelfth grade student in California dropped steadily from the 42nd percentile to the 32nd percentile on national norms in written expression. In 1975-76 the median student moved up to the 34th percentile, in 1976-77 back to the 33rd percentile, and this year back up to the 34th percentile--16 points below the national average. See Chapter VIII, "Comparisons with National Norms," for details.

Skill Area Strengths and Weaknesses

The members of the English Language Assessment Advisory Committee were pleased to see the gains made by both sixth and twelfth graders in written expression from 1976-77 to 1977-78. The committee members analyzed the test results to identify strengths and weaknesses in skill area performance. They concluded their analysis with instructional recommendations.

While the discussion of skill area strengths and weaknesses is based on the committee's judgments, the Department of Education accepts full responsibility for the interpretations in this report.

Sixth Grade Results

After reviewing the written expression results for grade six students, the English Language Assessment Advisory Committee concluded that sixth graders displayed a respectable command of several fundamental written expression skills, while they exhibited a need for increased instruction in others. Their conclusions are summarized in the following Figure:

Figure 6

Committee Judgments of Sixth Grade Skill Area Results

Area of strength	Area in need of improvement
Selecting the correct form of a word for a sentence	Spelling words with suffixes
Selecting the correct verb or pronoun according to standard English usage	Capitalizing the days of the week and months of the year
Discriminating between complete and incomplete sentences	Identifying the most specific or general word in a group of words
	Selecting a word which is most likely to convey a particular feeling or attitude

The committee offered the following instructional recommendations for the sixth grade written expression skill areas that they judged to be in need of increased instructional emphasis:

1. A more efficient approach to teaching spelling is needed at the elementary level. Children should be exposed to homogeneous groups of words (words that follow similar spelling patterns) so that they can more easily internalize spelling generalizations that also apply to many other words. Such instruction should include more emphasis in the generalizations pertaining to the spelling of words with suffixes. If students fail to form such basic generalizations in the third and fourth grades, where they are first introduced, these lessons should be retaught, reviewed, and practiced in the fifth and sixth grades.

2. Some of the simplest capitalization rules pertaining to days of the week and months of the year need to be retaught and reinforced in the fourth, fifth, and sixth grades. Intermediate students also need more specific instruction in the skill of identifying all the words in a multiple word proper noun and recognizing that all of them must be capitalized.

3. Focussed instruction and skill-building practice are needed in the language choices skill area to help pupils understand some of the issues related to effective word choices. Pupils need this understanding if they are to write effectively, read critically, and be alert to propaganda devices in all the media.

Twelfth Grade Results

The committee discerned a pattern of strengths and weaknesses in the twelfth grade results which corresponded to the sixth grade pattern at several points. The twelfth grade pattern is summarized in Figure 7 below.

Figure 7

Committee Judgments of Twelfth Grade Skill Area Results

Area of strength	Area in need of improvement
Selecting the correct form of a word for a sentence	Spelling words with suffixes
Discriminating between complete and incomplete sentences	Inserting punctuation in sentences where a knowledge of a rule or convention is necessary
Inserting punctuation in sentences where the sound of spoken English could be used as a guide	Recognizing the most specific or general word in a group of words
	Selecting a word which is most likely to convey a particular attitude or emotion
	Identifying basic grammatical elements in sentences
	Recognizing the most effective and concise statement of an idea
	Achieving coherence in paragraphs

In response to some of the weaknesses identified in the twelfth grade written expression results, the committee recommended the following instructional practices:

1. A skill maintenance program in spelling for junior and senior high school students is needed. Such a program should involve a highly structured approach to spelling instruction, which would introduce words grouped according to spelling generalizations, particularly generalizations that apply to the formation of new words by the addition

of suffixes to a base word. This kind of structure, coupled with appropriate practice, should enable students to learn a number of highly useful generalizations which can be applied to many other words. More time and especially more efficient and specific instruction should be devoted to the spelling needs of junior and senior high students.

2. Intermediate and secondary students should have more experience and especially more focussed instruction in a number of areas related to effective language choices in writing. These areas include the degree of specificity of a word and the emotional tone conveyed by a word in a particular context. The Reading Assessment Advisory Committee (which found that many twelfth grade students displayed confusion on some of the reading questions requiring them to detect the author's emotion or attitude in a selection) concurred that students need more focussed instruction in the language choices skill area.

3. Specific and sequential instruction in a variety of paragraph skills (including stating ideas in a logical sequence, using transitions, and achieving consistency of verb tense and pronoun reference) is needed at the secondary level. Such instruction in paragraph skills should be reinforced by the detailed examination and discussion of written material through sustained classroom discussions. Members of the Reading Assessment Advisory Committee concurred with the English Language Assessment Advisory Committee in feeling that the intensive study of paragraphs skills is likely to increase reading comprehension as well as improve coherence in student writing.

Written Expression Results for Grade Six

Test Scope

The written expression section of the Survey of Basic Skills: Grade 6 consists of 128 questions. The items were selected to assess the students' achievement of a broad array of objectives compiled by the English Language Assessment Advisory Committee and published in Test Content Specifications for the Survey of Basic Skills: Written Expression and Spelling, Grades Six and Twelve (Sacramento: California State Department of Education, 1975). Both the objectives and the items used to assess the objectives fell into one of seven major skill areas: word forms, language choices, standard usage, sentence recognition, sentence manipulation, capitalization, and punctuation. The relative degree of emphasis assigned to each of the written expression skill areas on the Survey of Basic Skills: Grade 6 is presented graphically in Figure 8.

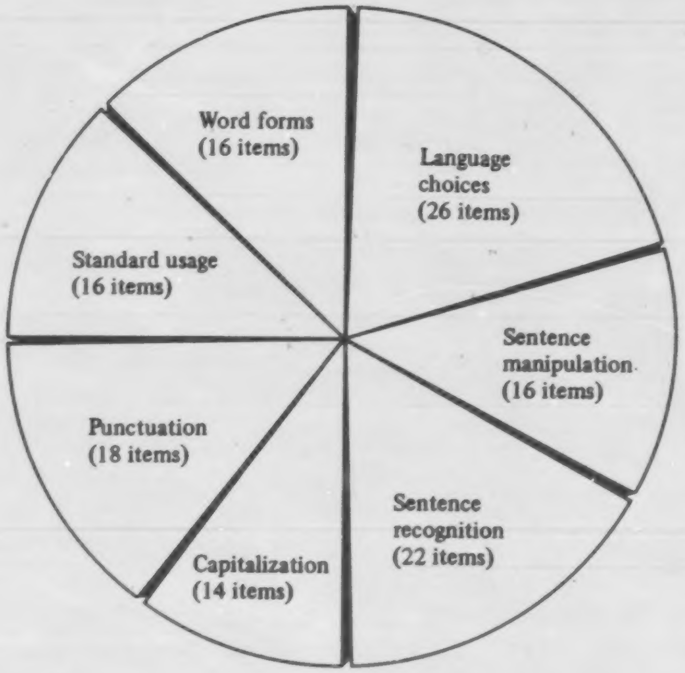


Fig. 8. Number of questions, by skill area, in the written expression section of the *Survey of Basic Skills, Grade 6*

There are also 64 spelling questions on the Survey of Basic Skills: Grade 6. Of these, 35 items tested pupils' spelling knowledge of both predictably spelled words and spelling demons; the other 29 items tested pupils' knowledge of common spelling patterns used in word forming when suffixes and prefixes are added to words.

Comparison of 1975-76, 1976-77, and 1977-78 Results, Grade 6

The results of sixth grade performance on the total written expression test and in each of the skill areas for 1975-76, 1976-77, and 1977-78 are presented in Table 6. Year-to-year changes in overall performance and in skill area performance are also shown in the table.

Table 6

Statewide Mean Scores on the Written Expression Portion of the Survey of Basic Skills: Grade 6, 1975-76 through 1977-78

Skill area	Number of questions	Average percent correct			Change	
		1975-76	1976-77	1977-78	1975-76 to 1976-77	1976-77 to 1977-78
WRITTEN EXPRESSION, TOTAL	128	62.5	63.6	64.1	+1.1	+0.5
Word forms	16	82.4	82.3	82.9	-0.1	+0.6
Standard usage	16	75.3	75.3	75.8	0.0	+0.5
Language choices	26	54.4	56.5	55.2	+2.1	-1.3
Sentence recognition	22	62.3	63.0	63.7	+0.7	+0.7
Sentence manipulation	16	61.7	62.6	63.1	+0.9	+0.5
Capitalization	14	57.4	58.4	59.8	+1.0	+1.4
Punctuation	18	52.4	52.5	54.4	+0.1	+1.9
SPELLING, TOTAL	64	63.6	63.6	64.1	0.0	+0.5
Relationships	35	58.1	58.1	58.6	0.0	+0.5
Word forming	29	70.2	70.3	70.8	+0.1	+0.5

The following conclusions are apparent from an examination of the data in Table 6:

- For the second year sixth grade performance in written expression improved. The increase from 1976-77 to 1977-78 (0.5) was about half as great as the increase between 1975-76 and 1976-77 (1.1), yielding an overall increase of 1.6 percent correct for the three-year period.

- From the spring of 1977 to the spring of 1978, gains were made in all skill areas except language choices, which registered a decline of 1.3 percent correct (see Examples H and I for illustrations of language choice questions). The skill area registering the largest increase during this time span was punctuation.

Analysis and Interpretation of Skill Area Results, Grade 6

Members of the English Language Assessment Advisory Committee analyzed, interpreted, and evaluated the 1977-78 written expression results, as they have done in previous years. In judging the adequacy of student performance, they considered such factors as the inherent difficulty of the skills, the particular items that were used to measure each skill, and changes in performance since 1975-76. Guided by an understanding of the kinds of errors students are making, the committee concluded their analysis with recommendations for instruction.

Spelling. The 64 spelling questions on the Survey of Basic Skills: Grade 6 were designed to assess students' knowledge of regularly spelled words, spelling demons, and words formed by the addition of prefixes or suffixes. The following example is a typical spelling item from the Survey.

Example A

Fill in the oval next to the MISSPELLED word in each group. If there is no misspelled word, the answer is "All correct."

(1) ○ clean
(66) ● breaze
(2) ○ please
(31) ○ All correct

In their analysis of the spelling results, members of the committee were disturbed by percent correct scores on a number of test words involving the addition of a suffix to a base word, as in the following examples:

Example B

Pairs of words are given below. In each pair, one word is spelled correctly, and the other is spelled incorrectly. Fill in the oval next to the CORRECT SPELLING.

(20) ○ forgeting

(80) ● forgetting

Example C

(37) ○ careing
(63) ● caring

The committee judged that the scores on these and similar items were unnecessarily low since each of these words illustrates a highly regular and predictable generalization about how a word is spelled when a suffix is attached to it. The members concluded that spelling should be taught in a systematic and structured way (preferably through the use of a spelling text) so that students are exposed to clusters of words which follow a particular spelling pattern (rather than merely exposing children to a list of regular and irregular words in every lesson). In this way students are more likely to internalize spelling generalizations that apply to large groups of words. The committee added that if students fail to master some of the basic spelling generalizations related to suffixes in the third and fourth grades where they are first introduced, these lessons should be retaught, reviewed, and practiced in the fifth and sixth grades.

Punctuation and capitalization. The 18 punctuation items on the Survey of Basic Skills: Grade 6 required pupils to identify errors in the common uses of the period, question mark, exclamation point, comma, apostrophe, and quotation marks.

While punctuation remained the most difficult skill area on the sixth grade written expression test, with an average percent correct score of 54.4, it was also the skill area showing the largest gain from 1976-77 to 1977-78. The following example is an illustration of both the upward trend over the years and the average performance in this skill area. The set of scores accompanying the example refers to this one item only.

Example D

The following sentences may have a mistake in punctuation (periods, commas, apostrophes, etc.). When you find a mistake, fill in the oval next to the line with the mistake. If there is no mistake, fill in the fourth oval.

(5) ○ This summer we are
(54) ● going to Hollywood California
(4) ○ for at least three days.
(37) ○ (No mistakes)

Percent Correct	
1975-76	48.3
1976-77	51.7
1977-78	54.2

The 14 capitalization questions on the Survey required pupils to recognize the parts of a sentence containing words needing capitalization. While members of the committee were pleased to see the considerable gains made by sixth graders in capitalization, they judged that scores were still too low on questions involving days of the week and months of the year. The committee expected the vast majority of sixth graders to recognize that a day of the week should be capitalized; however, only about 60 percent of the pupils did so on the following question and others like it:

Example E

In the following sentence you are to look for mistakes in capitalization. When you find a mistake, fill in the oval next to the line with the mistake. If there is no mistake, fill in the fourth oval.

(64) ● On monday my
(5) ○ brother always rides
(4) ○ his bicycle to school.
(27) ○ (No mistakes)

Members of the committee also observed that many sixth graders capitalized only the first word of a proper noun involving more than one word, a fact which suggests that a large number of students need a better grasp of the concept of a proper noun.

Word forms, standard usage, and language choices. The 16 word form questions on the Survey required students to select the correct form of a word for a blank in a given sentence. This skill area continued to be the easiest one on the test, with an average percent correct score of 82.9. The following word form question illustrates the typically high performance in this skill area.

Example F

Fill in the oval next to the word or words that best fit each sentence.

The flag was still ______ over Fort Ross.

(2) ○ wave
(6) ○ waves
(91) ● waving
(1) ○ had waved

One can see by comparing Example F with Examples B and C that while most pupils can select the correct form of a word for a sentence, fewer pupils can spell the new form of the word correctly. Thus, it appears that in most cases, the chief difficulty for students in adding suffixes to words lies in spelling the new form of the word rather than in recognizing or using it.

The 16 standard usage questions on the Survey required students to select the form of a verb or a pronoun that is considered correct according to standard English usage. A majority of students continued to respond correctly to questions of this type, such as the following example:

Example G

Fill in the oval next to the choice that is correct for each sentence.

The doctors______everything possible.

(82) ● did
(18) ○ done

While members of the committee were quite pleased with the scores and progress shown in the areas of word forms and standard usage questions, they were somewhat concerned about the decline registered in language choices from 1976-77 to 1977-78. The language choices area is designed to test students' skill in making careful word choices for different purposes. For example, some questions required students to select the most specific and vivid word for a sentence while other language choices questions required students to select a word reflecting a particular emotional tone in a given context. Examples of both kinds of language choice items follow.

Example H

Pretend that you are writing a story. Fill in the oval next to the word or words that will give your reader the clearest, most specific and concrete picture.

EXAMPLE:

At the bottom of her lunch sack she found _______.

0 some food
● a carrot
0 a snack
0 a vegetable

I could smell______cooking.

(66) ● bacon and eggs
(9) ○ a hot meal
(10) ○ some good food
(15) ○ breakfast

Example I

Fill in the oval next to the word or group of words that answers the question.

Which of the following best shows that John's attitude was unfriendly?

"Where are my bat and ball?"________ John.

(8) ○ called
(20) ○ said
(57) ● grumbled
(15) ○ exclaimed

Members of the committee expressed concern about the declining scores on such questions because understanding the special effects created by word choices in written English is an important writing and reading skill. They were particularly concerned about the decline in scores on language choice items registered by twelfth graders since the committee's expectations were higher for seniors on this more refined skill area.

The committee also observed what appears to be a related weakness in the twelfth grade reading results. On a number of reading test items that required students to identify the emotion created by the word choices in a piece of writing, scores were quite low. Since language choices cropped up at different grade levels and in different content areas as a weakness, members of the committee recommended more intensive instruction in this skill area. They recommended focussed instruction that would require students to make word choices according to degrees of specificity and particular emotional effects. The committee also suggested that teachers might construct some practice exercises parallel to the sample items shown in the interpretive supplements and Test Content Specifications as one possible strategy for providing students with such skill-building practice. As is stated in the English Language Framework[1] "Practice in making the best word choice for precision and clarity should be regarded as important to each writing experience."

Sentence recognition and sentence manipulation. The 22 sentence recognition questions required pupils to identify complete sentences, incomplete sentences, run-together sentences, and sentences in normal English word order. The committee was pleased to see the consistent progress shown by sixth graders in sentence recognition. Example J is a typical sentence recognition item. (The data reflects both average performance in this skill area and the upward trend registered for sentence recognition since 1975-76.)

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[1] English Language Framework for California Public Schools, Sacramento: California State Department of Education, 1976, p. 45.

Example J

Fill in the oval next to the group of words which needs more words to make it a complete sentence.

(12) ○ They brought a present.
(17) ○ We are happy.
(9) ○ Barry is not here.
(62) ● In the dark of the night.

Percent Correct	
1975-76	58.7
1976-77	61.1
1977-78	62.2

A close examination of Example J suggests that many pupils relied more heavily upon the length and sound of a word cluster that upon its structure in determining the completeness of a sentence. The committee was not discouraged by this, however, since an emphasis on grammatical structure is often delayed until junior high school.

Most of the 16 sentence manipulation questions required pupils to select the most effective sentence or sentence element, a skill that involves recognizing the clearest, most concise, and most direct way of expressing a statement. The following example is illustrative:

Example K

Beneath each sentence you will find four ways of writing the underlined part. Choose the answer that would make the best sentence, and fill in the oval next to it. The first answer is always the same as the underlined part and is sometimes the correct answer.

Besides selling candy, flowers and greeting cards are also sold by Mr. Grog.

(15) ○ Besides selling candy, flowers and greeting cards are also sold by Mr. Grog.
(24) ○ Not only candy, but Mr. Grog sells flowers and greeting cards too.
(7) ○ Candy as well as flowers and greeting cards, too, all of these are sold by Mr. Grog.
(54) ● Mr. Grog sells not only candy, but flowers and greeting cards as well.

Since this and other questions in the sentence manipulation category tend to be relatively subtle and sophisticated for sixth graders, members of the committee were pleased that performance was this high and that slight increases were shown for sentence manipulation as a whole.

Summary of Committee's Findings and Recommendations

Members of the English Language Assessment Advisory Committee were gratified to see a second year of increasing sixth grade written expression scores. In their analysis of the test results, committee members discerned the following pattern of strengths and weaknesses, a pattern that paralleled a number of points from the analysis of twelfth grade written expression results:

- A majority of sixth graders can handle basic written expression skills such as the following: (1) selecting the correct form of a word for a sentence (Example F); (2) selecting the form of a verb or pronoun considered correct according to standard English usage (Example G); and (3) discriminating between complete and incomplete sentences (Example J).
- Weaknesses occurred in the following skill areas: (1) spelling words with suffixes (Examples B and C); (2) capitalizing the days of the week and months of the year (Example E); (3) identifying the most specific or general word in a group of words (Example H); and (4) selecting a word which is most likely to convey a particular emotion (Example I).

Guided by an understanding of sixth graders' strengths, weaknesses, and most frequent mistakes, members of the committee offered the following instructional recommendations:

1. A more efficient approach to teaching spelling is needed at the elementary level. Children should be exposed to homogeneous groups of words following similar spelling patterns so that they can more easily internalize generalizations that apply to many other words as well. Such instruction should include more emphasis in the generalizations pertaining to the spelling of words with suffixes. If students fail to form such basic generalizations in the third and fourth grades, where they are first introduced, these lessons should be retaught, reviewed, and practiced in the fifth and sixth grades.
2. Some of the simplest capitalization rules pertaining to days of the week and months of the year need to be retaught and reinforced in the fourth, fifth, and sixth grades. Intermediate students also need more specific instruction in the skill of identifying all the words in a multiple word proper noun and recognizing that all of them must be capitalized.

3. Focussed instruction and skill-building practice are needed in the language choices skill area to help pupils understand some of the issues related to effective word choices. Pupils need this understanding if they are to write effectively, read critically, and be alert to propaganda devices in all the media.

Written Expression Results for Grade Twelve

Test Scope

The written expression section of the Survey of Basic Skills: Grade 12 consists of 142 questions. The items were selected to assess the students' attainment of a wide variety of objectives compiled by the English Language Assessment Advisory Committee and published in Test Content Specifications for the Survey of Basic Skills: Written Expression and Spelling, Grades Six and Twelve. Both the objectives and the items used to assess the achievement of the objectives fell into one of six major skill areas: word forms, language choices, sentence recognition, sentence manipulation, paragraphs, and capitalization and punctuation. The emphasis placed on each of the written expression skill areas in the Survey of Basic Skills: Grade 12 is shown in Figure 9.

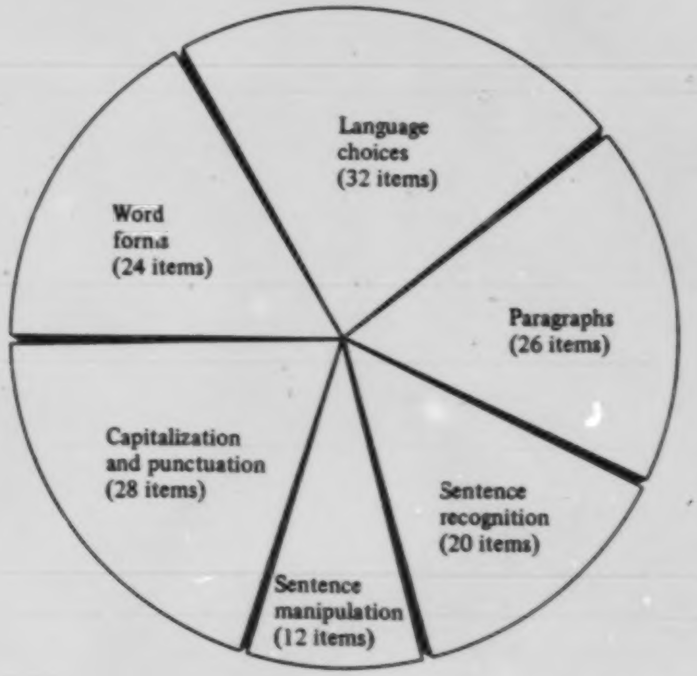

Fig. 9. Number of questions, by skill area, in the written expression section of the *Survey of Basic Skills: Grade 12*

There are also 72 spelling questions on the Survey of Basic Skills: Grade 12. These items tested students' knowledge of predictably spelled words, spelling demons, and words with prefixes and suffixes.

Comparison of 1975-76, 1976-77, and 1977-78 Results, Grade Twelve

The results of twelfth grade performance on the total written expression test and in each of the skill areas for 1975-76, 1976-77, and 1977-78 are presented in Table 7. Year to year changes in overall performance and in skill performance are also shown in the table.

Table 7

Statewide Mean Scores on the Written Expression Portion of the Survey of Basic Skills: Grade 12, 1975-76 through 1977-78

Skill area	Number of questions	Average percent correct			Change	
		1975-76	1976-77	1977-78	1975-76 to 1976-77	1976-77 to 1977-78
WRITTEN EXPRESSION, TOTAL	142	62.3	61.9	62.1	-0.4	+0.2
Word forms	24	72.6	72.1	72.1	-0.5	-0-
Language choices	32	66.9	66.7	66.6	-0.2	-0.1
Sentence recognition	20	67.3	67.7	68.4	+0.4	+0.7
Sentence manipulation	12	42.9	42.9	43.4	-0-	+0.5
Paragraphs	26	59.9	59.1	59.3	-0.8	+0.2
Capitalization and punctuation	28	54.6	54.3	54.7	-0.3	+0.4
SPELLING, TOTAL	72	68.0	67.9	68.4	-0.1	+0.5

The following observations about changes in performance are apparent from an examination of the results in Table 7.

- Twelfth grade performance in written expression improved slightly (0.2 percent) from 1976-77 to 1977-78. This small gain, however, did not completely offset the loss (0.4 percent) from the previous year, yielding a slight overall loss (0.2 percent) from 1975-76 to 1977-78.

- From 1976-77 to 1977-78 gains were registered in all skill areas with the exception of language choices, which suffered a slight decline (0.1 percent) and word forms, which remained stable. The largest gain over this time period was in the area of sentence recognition (0.7 percent).

Analysis and Interpretation of Skill Area Results, Grade 12

The 1977-78 written expression results for grade twelve were reviewed, interpreted and evaluated by the English Language Assessment Advisory Committee as were the sixth-grade results. In their analysis of the results, the committee members considered the inherent difficulty of the skills, the particular items that were used to measure each skill, and changes in performance since 1975-76. Guided by an understanding of the difficulties students were having, the committee concluded their analysis with a number of instructional recommendations.

Spelling. The seventy-two questions in the spelling section were designed to measure students' knowledge of the spelling of regularly spelled words, spelling demons, and words with suffixes. The average percent correct score for this category was 68.4. The following item illustrates the way in which spelling was assessed on the grade twelve Survey.

Example A

In each of the following sentences, one word is underlined and is written in BOLD TYPE. Fill in the oval next to "right" if the word is spelled correctly or next to "wrong" if the word is spelled incorrectly.

What did you do on the **Forth** of July?

○ Right (27) ● Wrong (73)

Members of the committee observed the same kind of spelling problem in the twelfth grade results as they had reported in those for the sixth grade, namely difficulties with the spelling of a word once a suffix had been attached. The following items illustrate this difficulty:

Example B

He **discoverd** a new method of communication.

○ Right ((57) ● Wrong (43)

Example C

Our school offers a course in creative **writting**.

○ Right (38) ● Wrong (62)

Members of the committee were disturbed to see that so many twelfth graders had failed to learn some of the most basic rules for adding suffixes to words (see Examples B and C). They were particularly surprised to see that over half of the students indicated that "discoverd" was correctly spelled.

On the basis of these and similar data, the committee recommended a skill maintenance program in spelling for junior and senior high school students. Such a program may well employ a highly structured approach to spelling instruction which would introduce words grouped according to spelling generalizations, particularly generalizations which apply to the formation of new words when suffixes are attached to a base word. This kind of structure coupled with appropriate practice should enable students to learn a number of highly useful generalizations which can be applied to many other words. The committee members added that a new spelling series with heavy emphasis on these basic word-forming generalizations is needed at the junior high level. Thus, more time and especially more efficient and specific instruction should be devoted to the spelling needs of junior and senior high students.

Punctuation and capitalization. Punctuation and capitalization continued to be the second most difficult written expression skill area for twelfth graders on the Survey as the average percent correct score of 54.7 in Table 7 reflects. Performance has been remarkably stable in this skill area over the years with a slight upward gain (0.4 percent correct) from 1976-77 to 1977-78. The scores on the questions varied considerably. The following question is an example of an item in which about three-fourths of the seniors responded correctly:

Example D

In the following sentence which punctuation is needed?

We visited Taliesen West Frank Lloyd Wright's famous home in the desert.

(76) ● West, Frank
(15) ○ visited, Taliesen
(2) ○ famous, home
(7) ○ home, in

Members of the committee have observed that many more students performed successfully on questions where punctuation coincided with the natural junctures of spoken English (as in Example D). However, where students had to use knowledge of a convention as a guide, the percent correct scores dropped substantially as is illustrated in the following example:

Example E

In each sentence there may be an error in capitalization or punctuation. The error, if any, is underlined and lettered. If there is an error, select the one underlined part that must be changed to make the sentence correct. If there is no error, the answer is D.

"Mice, as well as other pets, need some peace
and quiet, but they should'nt be left entirely
A B
alone," advised Dr. Crane, the veterinarian.
C

No error
D

○A ●B ○C ○D
(9) (59) (11) (21)

The scores on this question also illustrate the difficulty which students evidently have at all grade levels with apostrophe usage--in both contractions and possessives.

Word forms and language choices. Most of the 24 word form questions on the Survey required students to select the correct form of a word for a sentence and to demonstrate a variety of dictionary skills for different purposes. As a whole this category continued to be the easiest for twelfth graders. For example, the vast majority of students selected the correct form of a word for a sentence as the following item illustrates:

Example F

Select the form of the word which best completes the following sentence.

The girl did her work very ________.

(1)○ cheerfulness (7)○ cheerful
(92)○ cheerfully (0)○ cheer

Thus, as was true for sixth graders, the difficulty for twelfth graders in using suffixes seems to be in spelling different forms of a word correctly, rather than in selecting the correct form of the word for use in a sentence.

The thirty-two language choice questions required students to identify attitude-conveying words and phrases, to differentiate between specific and general words, and to identify the intended audience of a piece of writing. Language choices is the one written expression skill area on the Survey that has shown a decline for two years in a row. This was also the only skill area to register a decline from 1976-77 to 1977-78 in the sixth grade written expression results. The following are examples of two kinds of skills assessed by the language choice questions:

Example G

Dr. Henry J. Heimlich, ______ at Jewish Hospital in Cincinnati, described the technique in the journal *Emergency Medicine* and invited physicians to try it in real emergencies.

Which of the following terms is most respectful in the context of the above sentence?

(62) ● director of surgery
(1) ○ chief blade
(17) ○ practitioner
(20) ○ head doctor

Example H

Which of the following words or groups of words is most SPECIFIC?

(33) ○ current events magazine
(5) ○ publication
(55) *Newsweek*
(7) ○ magazine

The committee members were particularly concerned over both the low level of scores and the decline of scores on questions like the one shown as Example H. This kind of skill is one of considerable concern to the committee since student writing typically suffers from a lack of specificity. Such generality and vagueness in student writing may result from the fact that many students cannot even tell a specific word from a general word when presented with both.

As is stated in the English Language Framework[1]: "Students should recognize varying degrees of abstraction in words as well as degrees of generality in words by being exposed to continued experience in understanding that a word like car is more general than Pinto, and that abstract words like love, honor, and truth are emotion-arousing, highly abstract, and general; therefore, meaning different things to different people."

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[1] Ibid., p. 48.

The committee recommended more focussed instruction in language choices to supplement instruction in this area. Such focussed instruction should require students to make careful word choices based upon such factors as the degree of specificity, and the emotion conveyed by a particular word (as, for example, by developing exercises parallel to the language choice questions in the Test Content Specifications).

Sentence recognition and sentence manipulation. The twenty sentence recognition questions required students to identify complete sentences, sentence parts, sentence patterns, and the appropriate subject-verb relationship.

Sentence recognition continues to be the second easiest written expression skill area on the Survey for twelfth graders, and it is the only skill area to have registered an increase for two years in a row (0.4 and 0.7 percent). These increases may reflect a renewed focus on the sentence in the return to the basics. However, twelfth grade scores still varied greatly in the sentence recognition skills depending on the complexity of the question being asked. For example, over two-thirds of the students were able to identify the incomplete sentence in the following question:

Example I

Identify the group of words which is incomplete or needs additional words to complete the meaning.

(70) ● The barking dog in the driveway.
(6) ○ It is humid.
(18) ○ Peace continues.
(6) ○ There is the mail.

The error pattern for Example I suggests that many students relied more heavily upon the length of a word group than upon its structural components in determining the completeness of a sentence. The responses to the next example also indicate that over one-third of the twelfth graders are, indeed, confused about some of the basic grammatical elements of a sentence.

Example J

The_____ man seems very______.

The part of speech that will usually fill both blanks in the sentence above is:

(12) ○ a noun (62) ● an adjective
(18) ○ a verb (8) ○ a pronoun

Many twelfth grade students failed to demonstrate the ability to discriminate between effective and ineffective sentence style. Students continued to prefer awkward, indirect, wordy, and choppy sentences, often in the passive voice, to simple, direct, concise statements. The following example is an illustration of this difficulty:

Example K

> Beneath the following sentence you will find four ways of writing the underlined part. Choose the answer that makes the best sentence, and makr the oval in front of the answer you have chosen. The first answer is the same as the underlined part and may be the correct answer.
>
> On Sunday we bathed the dog, which he needed very badly.
>
> (40) ○ bathed the dog, which he needed very badly
> (5) ○ bathed the dog, which he very badly had need of
> (48) ● gave the dog a badly needed bath
> (7) ○ gave the dog a bath, being badly needed

As members of the committee have observed in previous years, high school seniors do not equate effective writing with conciseness.

Paragraphs. The 26 paragraph questions on the Survey required students to identify irrelevant sentences, recognize inconsistent verb tenses, determine logical sequences, select summary statements, and identify transitional words within one or more paragraphs.

Although scores on the paragraph section improved in the past year, twelfth graders failed to compensate completely for the decrease in paragraph skills scores registered from 1975-76 to 1976-77. Members of the committee expressed concern about any decline on these questions, which assess students' understanding of the relationships between sentences and paragraphs.

The following questions, based on the same paragraph, are illustrative:

Example L

> The seven sentences below are in a scrambled order. Some of them can be put together to make a single, unified paragraph. Before attempting to answer any questions, read all of the sentences carefully.

A 1 It probably received its name from its
2 copper-colored head which is triangular
3 in shape.
B 4 Like the rattlesnake, it is a member of
5 the pit viper family having a hollow or
6 pit between the eye and the nostril.
C 7 The copperhead was once the most common
8 and widely distributed of all venomous
9 snakes in the United States.
D 10 This may be the reason that Democrats in
11 the North who sympathized with the South
12 in the Civil War were called "copperheads,"
13 for they were suspected of treachery.
E 14 Unlike the rattlesnake, it has no rattles
15 and strikes without warning.
F 16 Augustus Thomas wrote a full-length drama
17 that he called *The Copperhead.*
G 18 Today, however, it is most frequently
19 found in sparsely settled areas of the
20 South.

Which sentence most logically follows Sentence C?

(18) ○Sentence A (14) ○Sentence E
(10) ○Sentence B (58) ●Sentence G

Example M

Which of the following words serves as a transitional word in the paragraph?

(15) ○which (line 2) ○copperhead (line 7) (18)
(13) ○rattlesnake (line 4) ●however (line 18) (54)

Members of the committee speculated that a weak grasp of sequence and transitional elements in paragraphs (illustrated by Examples L and M) may be related to the loss of coherence reported by the National Assessment of Educational Progress Project in its most recent study of the writing of seventeen-year-olds. Of equal concern to the committee was the confusion displayed by many students when asked to identify the sentence in a paragraph containing a verb with an inconsistent tense, as in the following example.

Example N

WASHINGTON (UPI)—(1) Director William E. Colby admitted Tuesday the CIA kept a secret cache of deadly poisons and forbidden weapons—including a suicide drug for captured U.S. spies—despite Presidential orders to destroy them in 1970.

(2) Later, Dr. Frank Gordon, a retired CIA scientist, identifies himself and two colleagues as the agency officials who secreted the most potent of the banned poisons in a vault where it remained hidden for five years.

(3) Gordon was questioned for hours by the Senate Intelligence Committee. (4) He said his group decided the White House directive did not apply to the CIA supply of deadly shellfish toxins because they were chemical, not biological, and because he thought the directive was meant only for the Army.

(5) In his testimony, Colby produced a black electric dart gun, slightly larger than a .45-caliber pistol, and explained it could fire poison-tipped darts 100 yards and kill a person silently and instantly at that range.

(6) Colby also said the secret cache of poisons made from cobra venom and shellfish toxins could be used in offensive weapons such as the dart gun or in new, improved suicide pills for U.S. spies.

Which sentence is inconsistent with the time development?

(21) ○Sentence 1 ○Sentence 3 (27)
(35) ○Sentence 2 ○Sentence 4 (17)

Members of the committee concluded that the weak performance on this kind of task reveals a lack of understanding of time patterns as it relates to consistency of verb tense in paragraph development.

Related to this difficulty is the one of establishing consistency of person in a sentence or paragraph. In the following test item, over half of the twelfth graders failed to detect the inconsistency between a pronoun and its referent:

Example O

In each sentence there may be an error. If there is an error, decide which underlined part must be changed to make the sentence correct. Mark the oval corresponding to the letter for the underlined part.

Many of Shakespeare's plays appear to question
A
whether it is within the power of man to
B
control your own destiny. No error
C D

○ A ○ B ● C ○ D
(10) (14) (45) (31)

The low score on this question may reflect a more basic difficulty, that of recognizing the referent of a given pronoun in the first place. In this case "man" is the referent of the incorrect "your." Such difficulties with pronoun reference were noted by the Reading Assessment Advisory Committee in their analysis of the reading results at all grade levels.

Summary of the Committee's Findings and Recommendations

Members of the committee were pleased to see the slight overall improvement shown by twelfth graders in written expression from 1976-77 to 1977-78. They are hoping that this year marks the beginning of an upward trend in written expression achievement for high school seniors. In their examination of the results, the committee discerned a pattern of strengths and weaknesses which is highlighted as follows:

- Most California high school seniors demonstrated an ability to handle some fundamental writing skills tested on the Survey of Basic Skills: Grade 12, such as the following:

    1. Selecting the correct form of a word in a sentence (Example F)

    2. Differentiating between complete and incomplete sentences (Example I)

    3. Inserting needed punctuation in sentences in which the natural junctures of spoken English could be used as a guide (Example D)

- Too many twelfth graders are showing unexpected confusion over the rudimentary skill of spelling words correctly when suffixes are attached (Examples B and C).

- Twelfth graders are also less adept at some of the more demanding language skills, such as:

    1. Using appropriate punctuation in sentences where the student must be guided by knowledge of a rule or convention rather than by the sound of spoken English (Example E)

    2. Recognizing the most specific or general word in a group of words (Example H)

    3. Selecting a word which is most likely to convey a given attitude or emotion (Example G)

    4. Identifying a particular grammatical element in a sentence (Example J)

    5. Recognizing the most effective and concise statement of an idea (Example K)

- The decline in paragraph skills from 1975-76 to 1977-78 is of particular concern to the committee since the ability to handle these skills is so closely related to coherence. Significantly, in its latest report on writing, the National Asessment of Educational Progress reported a decline in coherence in the writing of seventeen-year-olds throughout the nation.

Guided by an understanding of the difficulties students were having, the English Language Assessment Advisory Committee offered the following recommendations for teaching:

Spelling. A skill maintenance program in spelling for junior and senior high school students is needed. Such a program should involve a highly structured approach to spelling instruction which would introduce words grouped according to spelling generalizations, particularly generalizations which apply to the formation of new words by the addition of suffixes to a base word. This kind of structure coupled with appropriate practice should enable students to learn a number of highly useful generalizations which can be applied to many other words. More time and especially more efficient and specific instruction should be devoted to the spelling needs of junior and senior high students.

Language Choices. Intermediate and secondary students should have more experience and more focussed instruction in a number of dimensions which relate to effective language choices in writing. These factors include the degree of specificity of a word (see Example H) and the emotional tone conveyed by a given word in a particular context.(see Example G). The Reading Assessment Advisory Committee, which found that many twelfth grade students displayed confusion on some of the reading questions requiring them to detect the author's emotion or attitude in a selection, concurred that students need more focussed instruction in the language choices skill area.

Paragraphs. Specific and sequential instruction in a variety of paragraphs skills (including stating ideas in a logical sequence, using transitions, and achieving consistency of verb tense and pronoun reference) is needed at the secondary level. Such instruction in the paragraph skills should be reinforced by the detailed examination and discussion of written material through sustained classroom discussions.

Members of the Reading Assessment Advisory Committee concurred with the English Language Assessment Advisory Committee in feeling that the intensive study of paragraphs skills is likely to increase reading comprehension as well as improve coherence in student writing.

V. Mathematics Achievement for Grades Six and Twelve

Synopsis of Findings

The following summary is based on an analysis of the mathematics results obtained from the spring assessments in 1976, 1977, and 1978. The members of the California Mathematics Assessment Advisory Committee also met to express their views on the assessment results which are included in the summary.

Grade Six Achievement Improves

Over a three-year period, the overall mathematics achievement score of California's sixth grade public school students has improved 1.1 points in percent correct units. This has resulted in an increase of 2 percentile points on a publisher's national norms (Comprehensive Tests of Basic Skills). The percentile rank of the typical California sixth grade student now stands at 53 on that publisher's national norms. In 1977-78, the students showed a positive improvement in all four major content areas--arithmetic, geometry, measurement and graphs, and probability and statistics. The committee observed that out of the 15 subskills contained in these content areas the sixth grade students showed positive increases in thirteen, a slight decline in one and a significant decline in one (number properties).

Grade Twelve Achievement Stabilizes

After a slight decline in the period 1975-76 through 1976-77, the mathematics achievement score of the twelfth grade students in California's public schools remained the same in 1977-78 as the score in 1976-77. The percentile rank of the typical California twelfth grade student remains at 43 on a publisher's national norms. When the 1977-78 scores are compared with the 1976-77 scores, the twelfth grade students' scores improved slightly in arithmetic and in probability and statistics and declined slightly in algebra, geometry, and measurement. The advisory committee observed that out of a total of 17 subskills, the twelfth grade students showed significant improvement in one (decimal computation), a slight improvement in seven, slight declines in seven, and two remained stable.

Performance of Boys and Girls

An analysis of the results by sex showed that girls do consistently better than boys in computations with whole numbers, fractions, and decimals. The girls also outperformed boys in simple one-step word problems. However, the committee found that boys typically scored higher on word problems that were either multiple step problems or required more reasoning ability.

In geometry the girls scored higher than boys on questions involving recall and identification of geometric shapes, while boys achieved higher than girls on items dealing with spatial relationships and reasoning ability. In measurement the girls generally scored higher than boys on problems dealing with money; however, boys generally performed better than girls on the other questions.

At the twelfth grade the relative performance of boys and girls was compared taking into consideration the amount of mathematical preparation of the particular courses that students had completed. The committee noted that the girls continue to outperform boys at the twelfth grade in whole number and decimal computations. However, the girls do not keep up their relative achievement level in fraction computation at the twelfth grade. The committee observed that girls were considerably lower in the skill areas of measurement, geometry applications, and probability and statistics.

The committee refrained from speculating on the causes of these sex differences. It was felt that if further more intensive studies confirm these patterns, these findings may have some far-reaching implications for the design of instructional programs and teaching methods, especially at the elementary school level.

Recommendations

The committee offered the following recommendations for improving mathematics achievement across the grade levels.

Emphasis on problem-solving skills. At grade six the scores on application items were generally lower than the committee's expectations with the exception of those in the area of measurement and graphs. The committee strongly recommended increased development of and curricular emphasis on problem analysis and problem solving at all grade levels.

Emphasis on understanding basic operations. To enable the students to understand the reasons why an answer to a problem is correct and to help students understand why the operations are done in a certain way, the committee recommended an increased emphasis on teaching the concepts underlying basic arithmetic operations.

Emphasis on geometric relationships. The committee recommended an increase in the curricular emphasis at all grade levels on basic geometric relationships as they apply to practical situations. In particular, the opportunity for all students to develop and use spatial relationships should be increased.

Recommendations for further study. The committee recommended that the potential of matrix sampling be more fully exploited. For example, a new experimental test form should be introduced each year in order to (1) develop a systematic pool of new items that are sensitive to periodic changes in curriculum; and (2) to pursue in-depth studies in specific areas, such as exploration of sex differences in mathematics achievement.

Mathematics Results for Grade Six

Scope of the Grade Six Survey

The Survey of Basic Skills: Grade 6 was developed specifically to assess the students' attainment of mathematics skills taught through the sixth grade level in most California schools. The 160 questions on the Survey were designed to assess students' skills in the areas of arithmetic, geometry, measurement, and probability and statistics. Figure 10 is an illustration of the emphasis placed on each skill area in the total test. In the figure the skill area of arithmetic is subdivided into number concepts, whole numbers, fractions, and decimals. The emphasis on each area in the test is consistent with the general mathematics curriculum of most California schools and the recommendations in Mathematics Framework for California Public Schools. A detailed description of the skills assessed in the Survey is given in Test Content Specifications for the Survey of Basic Skills: Mathematics, Grades Six and Twelve (Sacramento: California State Department of Education, 1975). Additional descriptions of the major skills assessed in the Survey and example test questions are included in Appendix F of this report.

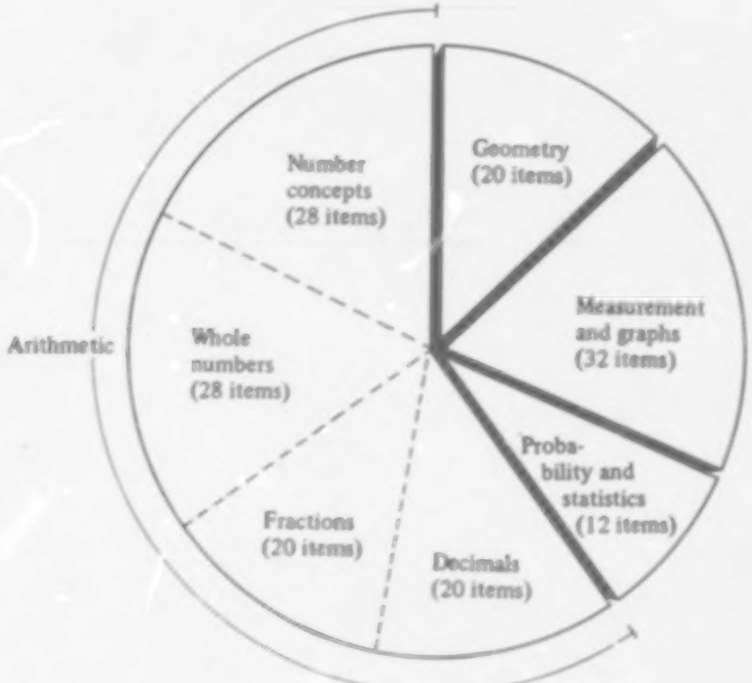


Fig. 10. Skill area emphases in the *Survey of Basic Skills: Grade 6*

Comparison of 1975-76, 1976-77, and 1977-78 Results, Grade Six

Table 8 contains a summary of the results of the mathematics portion of the sixth grade Survey for the past three years--1975-76 through 1977-78. The table also shows the changes in scores from 1975-76 to 1976-77 and from 1976-77 to 1977-78. A detailed breakdown of skill area results is given in Appendix F.

The following overall conclusions are apparent from an examination of the data in Table 8.

- The mathematics overall scores are improving consistently for the three-year period. The gains were stronger from spring, 1977, to spring, 1978, than from spring, 1976, to spring, 1977.
- Over the three-year period, the skill area of decimals has registered most gains followed by the skill area of measurement and graphs. Consistent but smaller gains are also registered in the skill areas of whole numbers and probability and statistics.

Table 8

Average Mathematics Scores and Changes in Scores on the Survey of Basic Skills: Grade 6, 1975-76 through 1977-78

Skill	Number of questions	Average percent correct			Change	
		1975-76	1976-77	1977-78	1975-76 to 1976-77	1976-77 to 1977-78
MATH, TOTAL	160	57.4	57.7	58.5	+0.3	+0.8
Arithmetic	96	61.0	61.0	61.8	0.0	+0.8
Number concepts	28	65.4	65.5	65.6	+0.1	+0.1
Whole numbers	28	66.9	67.5	68.0	+0.6	+0.5
Fractions	20	49.6	49.0	50.6	-0.6	+1.6
Decimals	20	56.3	57.8	59.0	+1.5	+1.2
Geometry	20	58.8	58.5	59.3	-0.3	+0.8
Measurement and graphs	32	52.1	53.5	54.4	+1.4	+0.9
Probability and statistics	12	40.4	40.9	41.6	+0.5	+0.7

Skill Area Results for Grade Six

The California Mathematics Assessment Advisory Committee reviewed in depth the mathematics results by skill areas, as they have done in previous years. The committee members judged the adequacy of student performance in light of the difficulty of the questions, the relative exposure of each skill in a typical classroom, and changes in student performances over a period of three years.

Arithmetic. The arithmetic portion of the Survey consists of a total of 96 questions in four skill areas--number concepts, whole numbers, fractions, and decimals. There was an overall increase of 0.8 percent correct in arithmetic from 1976-77 to 1977-78.

The number concepts questions assess knowledge and skills in the areas of numeration, number theory, and number properties. Of the 13 numeration questions, the scores increased on nine questions and decreased on three, resulting in an overall increase of 0.1 percent correct from 1976-77 to 1977-78. For the nine questions in number theory, the score remained essentially unchanged; however, of the six number properties questions, the scores declined for five and increased for one.

The Mathematics Assessment Advisory Committee remarked that a continued decline in the area of number properties will lead to a greater lack of understanding of the basic mathematical processes as the students proceed through the school program in mathematics. Example A is illustrative of the items that typically showed a decline.

Example A

Select the correct name for the missing number:

[illegible] = (3 X ☐) + (3 X 6)

(19) ○ 2
(12) ○ 6
(37) ● 20
(13) ○ 26
(19) ○ None of these

Percent Correct	
1975-76	40.9
1976-77	37.8
1977-78	36.5

On the 41 items involving computations with whole numbers, fractions, and decimals, the students' scores increased on 39 items and decreased on two when 1977-78 scores were compared with 1976-77 scores. Over the same period, on the 27 items involving application of whole numbers, fractions, and decimals, the scores increased on 19 items, decreased on six, and remained the same on two. The gains in student scores are shown in Table 8.

It was the judgment of the advisory committee that there was good, consistent growth on most of the computation items, particularly in computation with decimal fractions. The items on which there was little or no improvement involved comprehension of a process, rather than a simple knowledge of facts.

Examples B and C are typical of the problems on which scores consistently increased over the three-year period.

Example B

$64\overline{)386}$

(6) ○ 2 remainder 6
(5) ○ 6 remainder 1
(80) ● 6 remainder 2
(9) ○ 6 remainder 4

Percent Correct	
1975-76	77.0
1976-77	78.1
1977-78	79.9

Example C

Subtract 76.8 from 462.53.

(4) ○ 539.33
(24) ○ 454.85
(5) ○ 386.73
(37) ● 385.73
(30) ○ None of these

Percent Correct	
1975-76	25.9
1976-77	34.2
1977-78	37.3

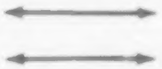
Geometry. An overall increase of 0.8 in the average percent correct in the major skill area of geometry occurred from 1976-77 to 1977-78. Of the twenty questions in geometry, students increased their average percent correct in seven out of eight questions concerning knowledge of facts and five out of 12 geometric application questions; the students' scores decreased on six questions and remained the same on two.

Most of the increase in geometry scores was the result of an improvement in the knowledge of geometric facts. The scores in the knowledge of facts increased 1.3 percent correct compared with a 0.4 percent correct increase for geometric applications. Example D is representative of the test items on which scores increased.

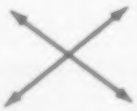
Example D

Which picture shows parallel lines?

(77) ●

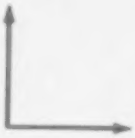


(6) ○

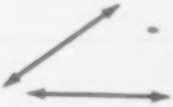


Percent Correct	
1975-76	74.8
1976-77	76.8
1977-78	77.1

(6) ○



(4) ○



(7) ○ None of these

In the judgment of the advisory committee, greater attention needs to be given to geometric applications in general in kindergarten through grade six. In particular, students seem to need increased instruction in identifying right angles, quadrilaterals, and facts such as the sum of the interior angles of a triangle is 180°.

Measurement and graphs. In the overall major skill area of measurement and graphs, students' scores showed an increase of 0.9 percent correct from 1976-77 to 1977-78. In the previous year scores in this skill area showed an increase of 1.4 percent correct.

Of the 32 questions in measurement and graphs, the scores increased on ten of the 14 questions concerning knowledge of facts and 15 of the 18 application questions. The scores decreased on four questions and remained the same on three questions.

The members of the committee inferred from the results that students do very well and are continuing to improve in reading and interpreting bar, circle, and simple line graphs. In addition, students continue to show strength in understanding linear measurement, money values, and reading scales and other measuring devices. On the other hand, test scores indicate that students continue to have difficulty understanding the concepts and computation of perimeter, area, and volume. In metric conversion, the committee members noted an improvement in scores; however, they judged that the scores were lower than desired. The committee recommended that some increased emphasis be given to this skill. Example E is a typical metric conversion problem.

Example E

2 metres 40 centimetres =

(3) ○ 24 centimetres
(34) ○ 42 centimetres
(22) ○ 80 centimetres
(41) ● 240 centimetres

Percent Correct	
1975-76	32.9
1976-77	39.7
1977-78	41.2

Probability and statistics. The sixth grade Survey includes 12 items on probability and statistics. Seven of the questions are related to simple statistical computation or based on an intuitive approach to probability. The other five questions require the students to apply concepts in probability and statistics to solve problems.

In the skill area of probability and statistics, the average percent correct score increased 0.7 percent correct from 1976-77 to 1977-78. The previous year's scores in this skill area showed a similar increase. From 1975-76 through 1977-78 the percent correct scores increased by 1.2. Overall, students' average percent correct scores increased on nine questions and decreased on three from 1976-77 to 1977-78.

Although the scores on these questions generally improved, the committee judged the scores lower than their expectations. The lowest scores were found to be on problems involving simple terminology, such as "average" and "mean." Since probability and statistics terms are used so frequently in everyday life (for example, "chances of rain," "batting averages," and "median salary"), students should be able to understand and use them. Example F is a typical item using common statistical terminology.

Example F

On a mathematics test students obtained the following scores:

68, 75, 80, 86, 95, 100

What is the range of these scores?

(13) ● 32
(6) ○ 42
(18) ○ 68
(26) ○ 100
(37) ○ None of these

Percent Correct	
1975-76	17.2
1976-77	13.7
1977-78	12.9

In the judgment of the committee, the test results indicate that students are learning some simple concepts of probability and statistics. However, more emphasis in classroom instruction needs to be given to the application of these common concepts and skills since these scores are lower than those on any other section of the mathematics test.

Mathematics Results for Grade Twelve

Scope of the Grade Twelve Survey

The Survey of Basic Skills: Grade 12 was developed to assess the degree to which students have acquired "basic" mathematics skills by the end of the the twelfth grade. A statewide committee compiled objectives and reviewed questions for inclusion in the test. The 198 questions on the Survey were designed to assess students' skills in the areas of arithmetic, algebra, geometry, measurement and graphs, and probability and statistics. Figure 11 is an illustration of the emphasis given to each skill area in the total test. In the figure the skill area of arithmetic is subdivided into the areas of number concepts, whole numbers, fractions, and decimals. A complete description of the skills assessed in the Survey is given in Test Content Specifications for the Survey of Basic Skills: Mathematics, Grades Six and Twelve (Sacramento: California State Department of Education, 1975). Additional descriptions of the major skills assessed in the Survey and example test questions are included in Appendix G of this report.

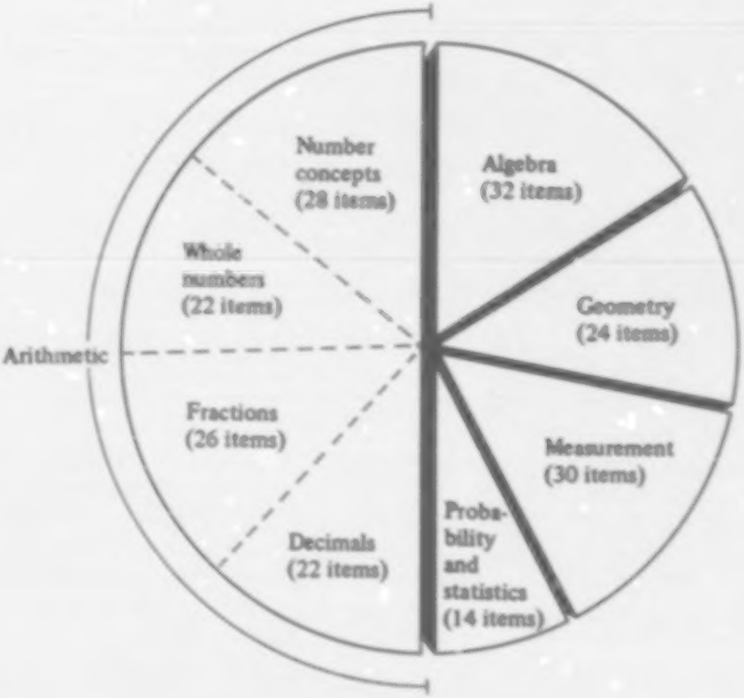


Fig. 11. Skill area emphases in the *Survey of Basic Skills: Grade 12*

Mathematics Results for Grade Twelve

Table 9 shows the mathematics achievement results of California twelfth grade students on the total test and in the skill areas for three years, from 1975-76 through 1977-78. A detailed breakdown of skill area results is given in Appendix G.

Table 9

Average Mathematics Scores and Changes in Scores on the Survey of Basic Skills: Grade 12, 1975-76 through 1977-78

Skill area	Number of questions	Average percent correct			Change	
		1975-76	1976-77	1977-78	1975-76 to 1976-77	1976-77 to 1977-78
TOTAL MATH	198	67.0	66.3	66.3	-0.7	-0-
Arithmetic	98	72.9	72.1	72.2	-0.8	+0.1
Number concepts	28	74.3	73.5	73.6	-0.8	+0.1
Whole numbers	22	80.1	80.1	80.1	-0-	-0-
Fractions	26	66.0	64.5	64.3	-1.5	-0.2
Decimals	22	71.8	71.2	72.0	-0.6	+0.8
Algebra	32	62.9	62.1	61.8	-0.8	-0.3
Geometry	24	62.7	62.1	61.8	-0.6	-0.3
Measurement	30	60.5	59.5	59.4	-1.0	-0.1
Probability and statistics	14	57.2	56.9	57.3	-0.3	+0.4

An examination of the data in Table 9 shows the following trends:

- The overall mathematics achievement of California twelfth grade students remained constant from 1976-77 to 1977-78 after a decline from 1975-76 to 1976-77.

- From 1975-76 to 1976-77 the decline in achievement occurred in all skill areas except in the area of whole numbers. The greatest decline was in the area of fractions. From 1976-77 to 1977-78 the decline continued in the skill areas of fractions, algebra, geometry, and measurement. However, the skill areas of decimals and probability and statistics registered a gain.

Skill Area Results for Grade Twelve

The following discussion is based on a review of the mathematics results by the California Mathematics Assessment Advisory Committee. The committee members judged the adequacy of student performance in light of the difficulty of the questions, the relative exposure of each skill to a typical student, and the changes in student performances over a period of three years.

Arithmetic. The arithmetic portion of the test consists of 98 questions in four skill areas: number concepts, whole numbers, fractions, and decimals. In Table 9 the arithmetic percent correct score for the three years is shown as 72.9, 72.1, and 72.2.

The 28 questions in the number concepts skill area include problems in numeration, number theory, and number properties. From 1976-77 to 1977-78 the students' scores showed increases on 15 questions, decreases on ten, and no change on three. The scores of students declined consistently over the three-year period on questions dealing with rounding of numbers, recognizing the place value of a digit, and recognizing odd and even numbers. The following test item is an example in which the score declined by approximately 7 percent correct during the three-year period. Approximately 27 percent of the students were not able to distinguish between tenths and tens.

Example A

In which numeral is the digit 7 in the tenths' place?

○ 976.3 (27)   ○ 97.63 (14)   ● 9.763 (50)   ○ 0.9763 (9)

Percent Correct	
1975-76	57.1
1976-77	52.2
1977-78	49.7

The Survey contains a total of 42 questions involving computation with whole numbers, fractions, and decimals. In whole number computation the scores increased on six questions, decreased on seven, and remained unchanged on one from 1976-77 to 1977-78. During the same period the scores in fractions increased on nine questions and decreased on five. In decimal computation the scores increased on all the 14 questions except one in which the score was unchanged. The percent correct score increased by 1.0 from 1976-77 to 1977-78 in decimal computation. Whole number computation and fraction computation scores increased by 0.2 and 0.1 percent correct respectively. Example B is an illustration of the type of test item on which the scores showed a continued increase.

Example B

$$\begin{array}{r} 2{,}759 \\ \times\ 806 \\ \hline \end{array}$$

(5) ○ 233,274   ○ 2,174,754 (4)
(5) ○ 2,173,754   ● 2,223,754 (86)

Percent Correct	
1975-76	84.1
1976-77	85.7
1977-78	86.4

On the 28 items involving applications of whole numbers, fractions, and decimals, the average score increased 0.6 percent correct in decimals and decreased 0.3 and 0.5 percent correct in whole numbers and fractions respectively from 1976-77 to 1977-78. The students' scores increased on all of the eight items in decimals. In whole numbers the scores decreased in six of the eight items; on the 12 items involving fractions, the scores increased on four, decreased on seven, and remained unchanged on one from 1976-77 to 1977-78.

Examples C and D are illustrations of the type of questions on which the scores generally declined from 1975-76 to 1977-78. These questions, and most others like them on which a consistent decline occurred, involved division.

Example C

There are 36 boys in our club. If we place them on 4 teams, how many will there be on each team?

(2) ○ 6 (2) ○ 12 (1) ○ 36 (1) ○ 40
(94) ● None of these

Percent Correct	
1975-76	95.1
1976-77	94.4
1977-78	94.0

Example D

A bar of candy was divided among three people so that Mildred had $\frac{1}{3}$ of the bar and Abby had $\frac{1}{2}$. What fraction of the bar was left for George?

● $\frac{1}{6}$	○ $\frac{1}{2}$	○ $\frac{2}{3}$	○ $\frac{5}{6}$
(77)	(2)	(14)	(7)

Percent Correct	
1975-76	80.6
1976-77	78.2
1977-78	76.9

The advisory committee was quite pleased with the average percent correct scores in computation with whole numbers (81.2) and in computation with decimals (74.8). They anticipated that improvement in these two skills in future years would probably be small. The committee felt that the average percent correct in computation with fractions (68.4) should be improved. The committee also felt that the average percent correct in applications of decimals (67.2) and applications of fractions (59.5) should be improved.

Algebra. In the major skill area of algebra, the scores declined 0.3 percent correct from 1976-77 to 1977-78. This decline followed the previous year's decline of 0.8 percent correct. Of the 14 algebraic computation items, the scores declined on ten and increased on four from 1976-77 to 1977-78. Of the 18 algebraic applications questions, which also included questions on the interpretation of tables, charts, and graphs, the scores declined on 12 questions, increased on four, and remained unchanged on two.

Examples E and F are illustrations of the types of test items on which the scores generally declined.

Example E

If $x = 3t$ and $y = 3t$, then $y =$

○ $9x$	○ $3x$	● x	○ $\frac{x}{9}$
(12)	(13)	(70)	(5)

Percent Correct	
1975-76	71.9
1976-77	70.9
1977-78	69.9

Example F

If $\frac{x}{3} = 6$, then $x =$

● 18	○ 6	○ 2	○ $\frac{1}{2}$
(77)	(2)	(19)	(2)

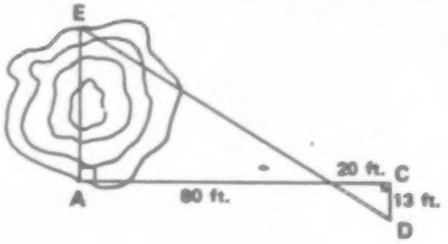
Percent Correct	
1975-76	80.6
1976-77	77.4
1977-78	76.5

Geometry. The geometry portion of the Survey consists of 24 questions. Half of the questions require the students to identify basic geometric sets and figures, and remaining half require them to apply basic geometric knowledge and concepts. As shown in Table 9, the overall average percent correct in 1977-78 was 61.8, a decline of 0.3 percent correct from the score in 1976-77. The overall geometry score also declined the previous year by 0.6 percent correct.

Of the 12 questions requiring students to identify geometric figures, the scores increased on five questions, decreased on six, and remained the same on one when 1977-78 scores were compared with those of 1976-77. These changes reflected no overall change in the knowledge of geometric facts from 1976-77 to 1977-78. In the previous year the knowledge of geometric facts increased 0.3 percent correct.

Of the 12 questions on geometric applications, the scores increased on five and decreased on seven questions when 1977-78 scores were compared with those of 1976-77. These changes amounted to an overall decrease of 0.6 percent correct from 1976-77 to 1977-78. In the previous year the score in geometric applications decreased by 1.4 percent correct. Thus, it is apparent that the overall geometry score declined because of the declining performance on geometric application questions. Example G is an illustration of the type of question on which the scores declined continuously over the period from 1975-76 through 1977-78.

Example G



In the figure above, the lines AE and CD are perpendicular to AC. What is the distance from A to E?

(27)	(33)	(17)	(4)
○ 40 ft.	● 52 ft.	○ 60 ft.	○ 65 ft.

○ None of these
(19)

Percent Correct	
1975-76	36.5
1976-77	33.8
1977-78	32.5

The average test item involving a recall of geometric facts was answered correctly by 75.5 percent of the twelfth grade students, and that percent remained consistent over the period from 1975-76 through 1977-78. It was the judgment of the advisory committee that student performance is nearly satisfactory with respect to the recall of geometric facts. An overall decrease of 2.0 in the average percent correct on application questions during the period from 1975-76 through 1977-78 was viewed with concern by the advisory committee. The committee judged that the average percent correct of 48.1 in geometric applications was too low.

In the judgment of the advisory committee, an increased curricular emphasis is needed in high school on applications of geometric relationships. In particular, the committee recommended an emphasis on problems involving similar triangles, the Pythagorean theorem, the sum of the angles of a triangle, and the identification of right angles and perpendicular lines.

Measurement. The 30 questions in the major skill area of measurement consist of 12 questions on recall or computation and 18 questions on applications. The overall percent correct in 1977-78 for the skill area of measurement was 59.4, which was 0.1 percent correct lower than the 1976-77 score. The measurement score declined 1.0 percent correct from 1975-76 to 1976-77.

Of the 12 recall or computation questions in measurement, the scores declined on eight questions, increased on three, and remained the same on one from 1976-77 to 1977-78. These changes resulted in an overall decrease of 0.4 percent correct on the recall or computation questions. From 1975-76 to 1976-77 the overall score declined by 1.1 percent correct on the same questions.

Of the 18 questions on measurement applications, the scores increased on seven questions, decreased on nine, and remained unchanged on two when 1977-78 scores were compared with those of 1976-77. These specific changes resulted in no change in the overall score in measurement applications from 1976-77 to 1977-78. In the previous year the score in this skill area decreased by 0.9 percent correct. Example H is typical of the test items on which the scores declined from 1975-76 through 1977-78.

Example H

A housewife will pay the lowest price per ounce for rice if she buys:

(11) ○ 12 ounces for 40 cents
(9) ○ 14 ounces for 45 cents
(36) ● 1 pound, 12 ounces for 85 cents
(44) ○ 2 pounds for 99 cents

Percent Correct	
1975-76	40.5
1976-77	36.8
1977-78	36.2

The advisory committee judged that twelfth grade students have a basic understanding of metric units and ability to convert from one metric unit to an equivalent metric expression. Students also did very well in converting from miles per hour to miles per minute. Example I is typical of the questions asked in the metrics section and of the scores achieved.

Example I

One metre is equal to 10 decimetres. How many metres are equal to 80 decimetres?

○ 800 (9) ● 8 (85) ○ 0.80 (5) ○ 0.08 (1)

Percent Correct	
1975-76	82.7
1976-77	84.1
1977-78	84.5

The committee noted that scores of students were low on consumer related questions. Since the development of intelligent consumers in one desirable goal of a good mathematics program, the advisory committee recommended that greater emphasis be placed on consumer mathematics involving such things as unit pricing. The committee also felt that since understanding the concepts of area and volume and computing areas and volumes continue to cause students difficulties, an increased emphasis should be placed on practical problems involving the use of formulas for computing perimeters, volumes, and areas of geometric figures.

Probability and statistics. The Survey includes 14 questions on probability and statistics. In this major skill area, the average percent correct score for 1977-78 was 57.3, which was a 0.4 percent correct increase over the previous year's score. From 1975-76 to 1976-77 the score in this area had decreased by 0.3 percent correct.

The six questions in this skill area require students to compute the probability of simple events and such statistics as the mean, the mode, and the median of a set of numbers. From 1976-77 to 1977-78 the scores on all six questions increased by 0.7 percent correct overall. In the previous year the score in this skill area decreased by 0.3 percent correct.

On the eight questions on applications, the scores increased on five questions, decreased on one, and remained the same on two. These changes resulted in an overall increase of 0.2 percent correct from 1976-77 to 1977-78. Example J is an illustration of an application question and a summary of student performance on the item.

Example J

A bowl contains 8 identical marbles, except for color. One is a white marble, 3 are red marbles, and 4 are blue marbles. If you were blindfolded and then removed one marble from the bowl, what is the probability that the marble you removed would be red?

(2) ○ 0 (12) ○ $\frac{1}{3}$ (67) ● $\frac{3}{8}$ (7) ○ $\frac{3}{4}$
(12) ○ None of these

Percent Correct	
1975-76	65.3
1976-77	65.9
1977-78	66.5

The advisory committee judged that most students have learned the computation of averages (means) but are not familiar with the important concept of median. Example K is a typical test item involving the computation of a median.

Example K

Find the median of the following set of numbers: 68, 92, 84, 72, 84, 75, 78

○ 84	○ 80	○ 79	● 78	○ 75
(23)	(18)	(32)	(17)	(10)

Percent Correct	
1975-76	14.1
1976-77	16.4
1977-78	17.0

The committee felt that since the basic probability and statistical concepts and terminology are common in day-to-day life, the classroom instruction should be designed to emphasize the applications of these concepts.

Mathematics Results for Girls and Boys

The California Mathematics Assessment Advisory Committee evaluated the relative performance of boys and girls in the various skill areas of mathematics. At the sixth grade level, data were available on the statewide performance of boys and girls on 160 items; and at the twelfth grade level, on 198 items. At the twelfth grade level, the data for boys and girls were also available for the number and kinds of math courses taken.

Achievement Differences at Grade Six

The committee did not expect to find, nor did they find, large overall differences between the mathematics performance of sixth grade girls and boys in as much as boys and girls share a common mathematics background in kindergarten through grade six. Furthermore, the test items were written to favor neither boys nor girls. For example, in the writing of the Survey items, an effort was made to use names of girls and boys with equal frequency in word problems. Care was also taken to present the problems in contexts that are familiar to both girls and boys.

The committee did identify some very interesting patterns, however, among those test questions where girls surpassed boys or where boys surpassed girls. The performance of boys and girls by skill area is summarized in Table 10. It can be seen that the overall percent correct is only slightly higher for boys and the total number of questions favoring either the girls or boys is nearly identical; but it also shows that in some skill areas the boys' performance strongly exceeded the girls' and in others the opposite is true (although not presented here, the patterns were completely confirmed in an analysis of the data for 1976-77). The following sections elaborate on these patterns.

Girls outperform boys in computation with whole numbers, fractions, and decimals. In the content areas of computation with whole numbers, fractions, and decimals, the girls outperformed boys by a considerable margin. For example, the girls scored higher than boys on all of the 16 questions in whole numbers, 11 out of 13 questions in fractions, and eight of the 12 decimal computation questions. Table 10 shows the percent correct scores for boys and girls on questions in these three skill areas. Examples A and B are illustrations of the performances of boys and girls on typical computation test items.

Example A

$$\begin{array}{r} 9333 \\ -\,8989 \\ \hline \end{array}$$

○ 1,344
○ 444
○ 344
○ 244
○ None of these

Percent Correct

	Boys	Girls
1976-77	73.3	78.3
1977-78	74.9	78.8

Example B

$\frac{3}{4} - \frac{3}{8} =$

○ $\frac{1}{8}$
○ $\frac{1}{4}$
○ $\frac{3}{8}$
○ $\frac{4}{3}$

Percent Correct

	Boys	Girls
1976-77	48.7	52.8
1977-78	50.4	54.6

The girls also did better than boys on five of the six number properties questions. These questions were designed to assess the students' knowledge of commutative and associative properties; however, these questions can also be solved algebraically.

Boys do better than girls in applications. In the content areas of applications of whole numbers and fractions, boys obtained higher scores than girls. However, on decimal application problems the girls performed better than boys. A closer look at the individual questions in decimal applications showed that while girls did better on problems that required a simple computation or only a one-step analysis, boys did better on problems that required more complex logical reasoning. Often these problems required an intermediate computation (two-step applications problem). This pattern seemed to be borne out in the area of applications of whole number and decimals. The two whole number applications problems on which girls did better than boys were simple one-step problems. The four decimal applications problems on which girls did better than boys were one-step computation problems involving money. On the decimal problems that demanded more reasoning ability or multiple-step computations, the boys outscored the girls.

It is particularly interesting to note that the relative performance of boys and girls did not seem to be related to the context of the problems. Example C is an illustration of this point.

Table 10

Mathematics Achievement of Sixth Grade Boys and Girls by Skill Area

Skill area	Description of skill	Number of questions	Number of questions on which:		Percent correct	
			Boys scored higher	Girls scored higher	Boys	Girls
Numeration	Names of numbers, place value, points on a number line	13	6	7	76.8	75.8
Number theory	Odd, even, prime, and composite numbers; LCM, GCF	9	4	5	55.7	56.3
Number properties	Commutative, associative, and distributive properties	6	1	5	55.8	57.5
Whole number computation	Addition, subtraction, multiplication, and division of whole numbers	16	0	16	77.0	80.6
Whole number applications	Word problems in whole numbers involving one-step, two-step, ratio, rounding, or algebraic equation	12	10	2	55.1	52.3
Fraction computation	Addition, subtraction, multiplication, and division of fractions	13	2	11	50.7	53.3
Fraction applications	Word problems involving operations on proper fractions and mixed fractions	7	6	1	49.4	46.3
Decimal computation	Addition, subtraction, multiplication, or division of fractions	12*	3	8	59.9	61.3
Decimal applications	Word problems involving one step and money	4	-	4	57.9	62.4
	Word problems--two steps or complex	4*	2	0	54.8	52.2
Geometry--knowledge of facts	Recognize square, quadrilateral, rectangle, angle, parallel lines, cylinder, pyramid, and diameter	8	2	6	69.9	69.5
Geometry--concepts	Concepts involving symmetry, congruency, similarity, locus, angle relationships in a triangle	12	7	5	52.7	51.9
Measurement--knowledge of facts	Conversion of length, mass, area, and time from one unit to another unit; perform operations on denominate numbers	14	11	3	49.4	46.5
Measurement--applications	Calculation of area and volume; reading line, bar, and circle graphs	18	12	6	60.7	58.2
Probability and statistics	Compute probability of simple events, calculate mean, mode, median and range	12*	10	1	42.6	40.5
Total		160*	76	80	58.7	58.3

* The scores for boys and girls were tied on one or more questions.

Example C

Mother needs 2 cups of sugar for 3 dozen cookies. How many cups of sugar will she need for 12 dozen cookies?

- ○ 5
- ○ 6
- ○ 8
- ○ 17
- ○ None of these

Percent Correct

	Boys	Girls
1976-77	50.5	43.5
1977-78	50.8	43.3

The problem in Example C is a good illustration of a question involving two operations. (The problem is usually solved by noting that in 12 dozen cookies there are 4 batches of 3 dozen. Thus 4 times 2--or 8--cups of sugar are needed). The committee suggested that the contexts and settings of mathematics problems probably bear a weak relationship to differential achievement of boys and girls, that is, in comparison to the effects of other variables, known and unknown.

Difference in performance of geometry questions. In geometry, girls scored higher than boys on six of the eight items involving vocabulary recall and identification of geometric figures. On the two recall questions on which boys scored higher than girls, the difference was very large, resulting in the overall percent correct for geometry recall questions in favor of the boys. On the 12 concept questions boys scored higher on seven and the girls scored higher on five. In examining the seven questions on which boys performed higher than girls, it seemed that many of them were related to spatial relationships. Example D is one of such problems.

Example D

If two different lines intersect, their intersection is:

- ○ a line segment
- ○ a line
- ○ a point
- ○ a triangle
- ○ a square

Percent Correct

	Boys	Girls
1976-77	37.5	33.2
1977-78	37.0	31.9

Differences in performance on measurement and graph questions. On the 32 questions in the skill area of measurement and graphs, boys outscored girls on 23 questions; girls outscored boys on nine questions. Typically, the boys did better than girls on such skills as adding, subtracting, multiplying, or dividing denominate* numbers, using a ruler measure, converting from one unit of measurement to another, and reading line and bar graphs. The girls generally did better than boys on circle graphs and simpler bar graphs.

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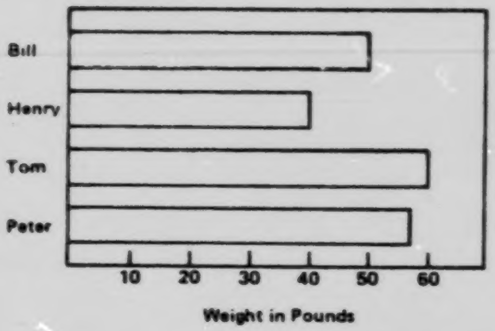
* A number that designated a quantity as a multiple of a unit. For example, in "12 pounds," 12 is a denominate number.

Example E is an illustration of the phenomenon that if the task was relatively straight-forward, the girls performed better; but if additional skills were required, the boys surpassed the girls.

Example E



Which boy weighs the most?

○ Bill
○ Henry
○ Tom
○ Peter

Percent Correct

	Boys	Girls
1976-77	96.7	97.5
1977-78	96.6	97.7

Which boy weighs closest to 50 pounds?

○ Bill
○ Henry
○ Tom
○ Peter

Percent Correct

	Boys	Girls
1976-77	79.9	72.6
1977-78	79.7	74.7

Differences in performance on probability and statistics questions. Of the 12 questions in this area, six were computation questions and the remaining six were word problems. All the computation questions required the reading of some simple directions. Overall, boys scored higher than girls on ten questions, scored lower on one, and the same on one. Example F is an illustration of the amount of difference between the performance of boys and girls on a typical question in this area.

Example F

On a math test

Alice scored 25,
Betty scored 45,
Cindy scored 20,
Dotty scored 30.

Who scored closest to the average of these scores?

○ Alice
○ Betty
○ Cindy
○ Dotty

Percent Correct

	Boys	Girls
1976-77	35.8	33.0
1977-78	35.8	34.5

Achievement Differences at Grade Twelve

The analysis of the twelfth grade math results for boys and girls took into consideration the mathematical backgrounds of the students. In the student information section of the test booklet, each student was required to provide information indicating whether he or she took general math, first and second year algebra, and geometry courses. The students also indicated the grade in which they took a particular course.

Number of students according to math preparations. Table 11 contains a summary of the percents of twelfth grade boys and girls according to their preparation in mathematics courses. In the table only those course combinations in which the total number of students was one percent or more are shown.

At the twelfth grade level, the California Mathematics Assessment Advisory Committee expected more boys to take advanced college preparatory mathematics courses than girls. This expectation was met as can be seen in the percent breakdowns in Table 11. For example, 24.0 percent of the boys took general math, algebra I and II, and geometry as compared to 17.7 percent of the girls. However, the overall disparity in percentages was not as great as the committee had expected. For example, 51.9 percent of the boys took two or more college preparatory mathematic courses (algebra I or II, and geometry) as compared to 46.7 percent of the girls. Since the University of California system requires at least two years of college preparatory mathematics, the committee also observed that approximately 49.3 percent of California's twelfth grade students met the math requirements for admission to the university system.

Mathematics achievement related to preparation. Table 11 also contains the average percent correct scores of students according to their preparation in mathematics. As the committee expected, a direct relationship between the scores and the number and degree of sophistication of the mathematics courses taken is shown by the data. From Table 11 it is also evident that the highest scoring group was the one that took only the three college preparatory courses (first and second year algebra and geometry), constituting 6.5 percent of the twelfth grade population. The score of this group was higher than that of the group that took general math and the three college preparatory courses. The lowest scoring group was the one that took general math only. It is, of course, not possible to determine how much of these differences are a result of the greater exposure to math concepts and skills, and how much they are a function of the general selection phenomena related to a variety of personal, school-related, family-related, and cultural factors.

Figure 12 depicts the skill area achievement of four groups of students, according to their math course background. The four course combination groups comprise approximately 83 percent of California twelfth grade students. It can be seen that the differences between the four groups are nearly linear for most of the skill areas. The scores for some skill areas are much higher than for others. For example, in the more elementary, foundational skills areas such as whole number computation and applications the results are uniformly high. One can also see that while the differences between groups is relatively uniform for the skill areas there are some lines that are much steeper, such

Table 11

Percent of Twelfth Grade Students and Their Percent Correct Scores by Mathematics Courses Taken

Mathematics courses taken	Percentage of students			Percent correct score		
	Boys	Girls	Total	Boys	Girls	Total
General Math only	23.1	25.5	24.3	51.6	48.6	50.0
Algebra I only	2.4	2.3	2.3	62.2	59.5	60.9
General Math + Algebra I	20.0	23.4	21.8	62.1	59.0	60.4
Algebra I + Geometry	2.2	2.5	2.3	74.2	72.2	73.1
General Math + Algebra I + Geometry	15.6	17.4	16.5	72.9	70.6	71.7
General Math + Algebra I + Algebra II	3.0	3.3	3.2	66.2	61.6	63.8
Algebra I + Geometry + Algebra II	7.1	5.8	6.5	88.1	84.4	86.4
General Math + Algebra I + Geometry + Algebra II	24.0	17.7	20.8	83.8	80.6	82.4
TOTALS	100.0*	100.0*	100.0*	68.6	63.9	66.3

* Includes 2.6 percent boys, 2.1 percent girls, and 2.3 percent of the total who completed other course combinations.

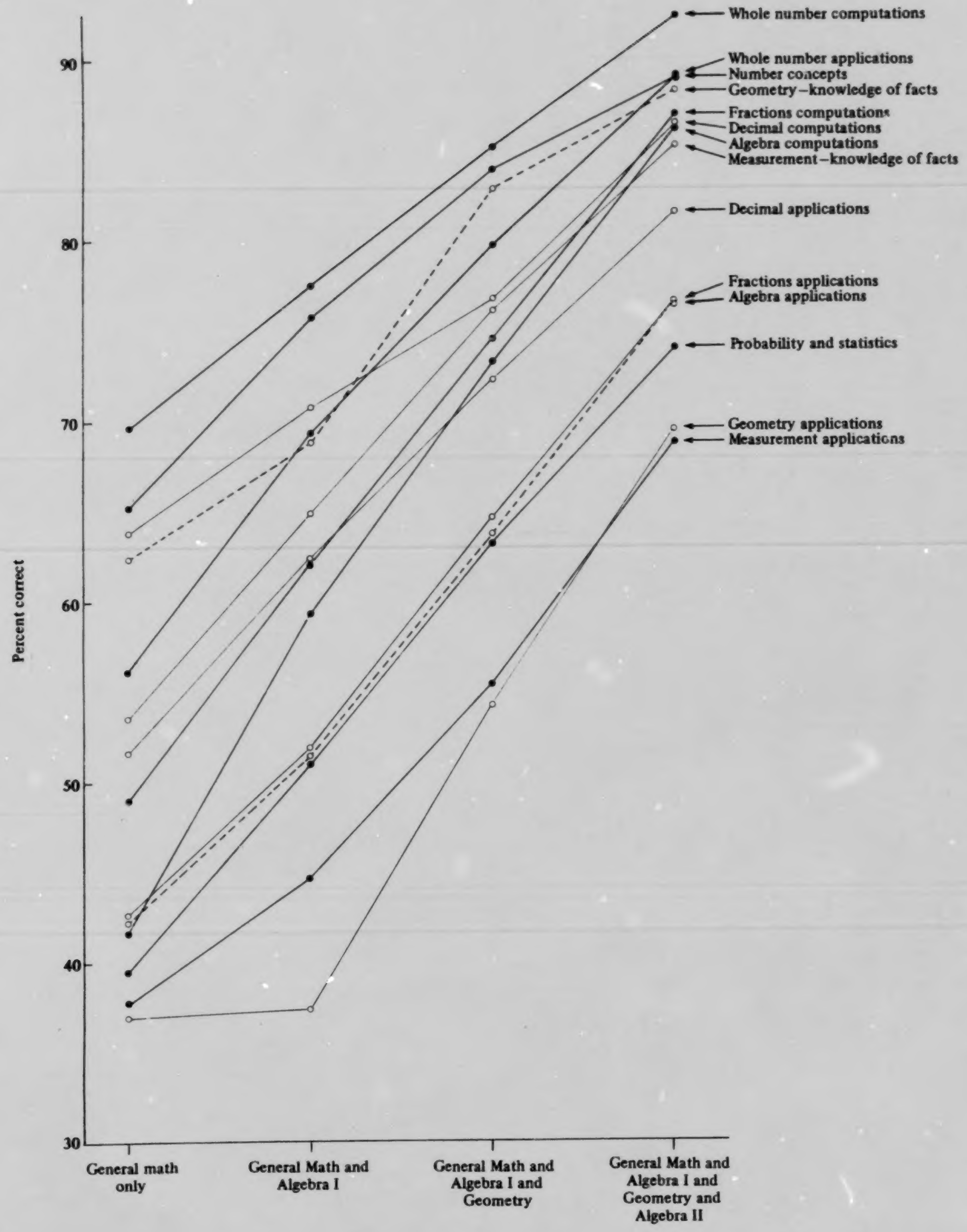


Fig. 12. Mathematics performance of twelfth grade students by skill area and course combination group

as that for algebra computations. One can speculate that this steeper gradient is a function of the impact of additional math instruction. In some cases, such as the lines for geometry applications and geometry knowledge of facts, the inflections in the line seem to be clearly related to the impact of specific courses.

Mathematics skill area achievement of boys and girls. Figures 13 through 16 depict the performance of boys and girls in each of the 14 skill areas according to the math course combinations they chose by the end of the twelfth grade. Figure 13 is a representation of the results for those who elected general math only, and Figure 16 is a representation of the results of those who elected general math, first and second year algebra, and geometry.

A comparison of the scores of boys and girls within the course combination groups reveals some patterns of relative strengths and weaknesses similar to those of sixth grade students. For example, girls continue to outperform boys in whole number computation. In decimal computation the scores of girls were higher than those of boys for all the course combination groups except the group that took all four math courses, in which the scores were very nearly the same. At the sixth grade level, girls performed better than boys in fraction computation; but at the twelfth grade level girls typically performed slightly lower than boys.

Comparing the relative performance of boys and girls in Figures 13 through 16, the committee remarked that for all course combinations girls are relatively weaker in their knowledge of facts concerning measurement. For example, girls do not do as well as boys in such skills as converting from one unit of measure to another unit(within the same system) and in operations on denominate numbers. The relative performance of girls is also lower in the skills of measurement applications, geometry applications, and probability and statistics.

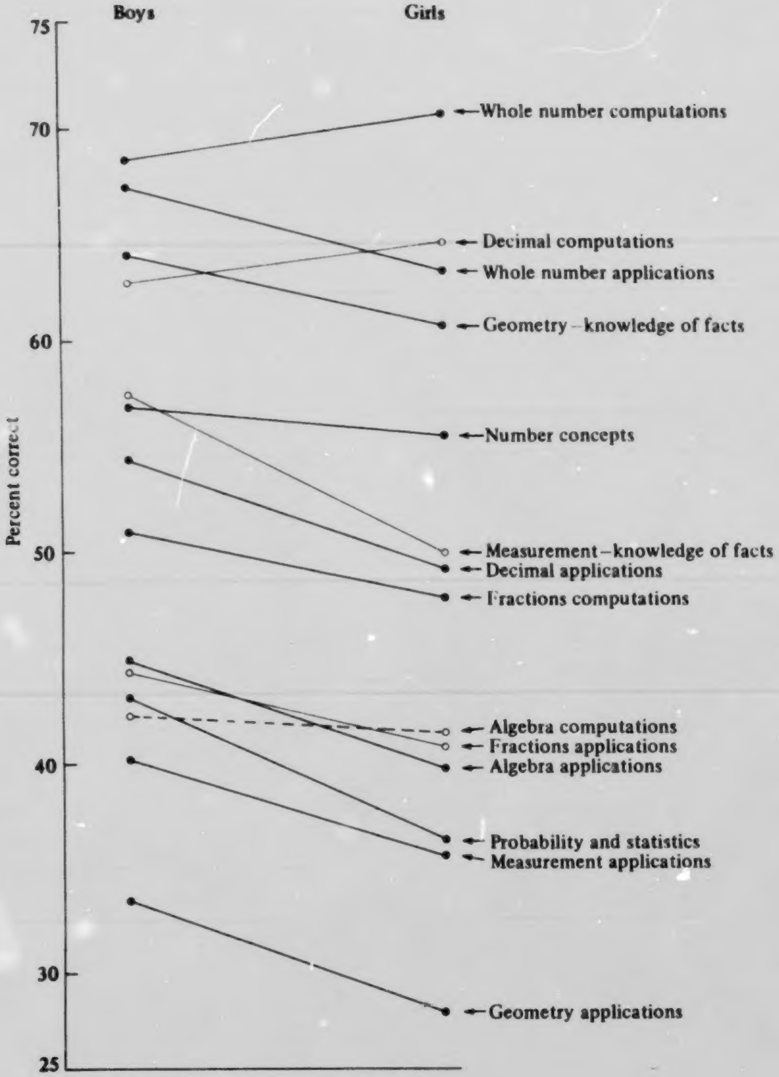


Fig. 13. Mathematics performance of twelfth grade boys and girls who completed general math only

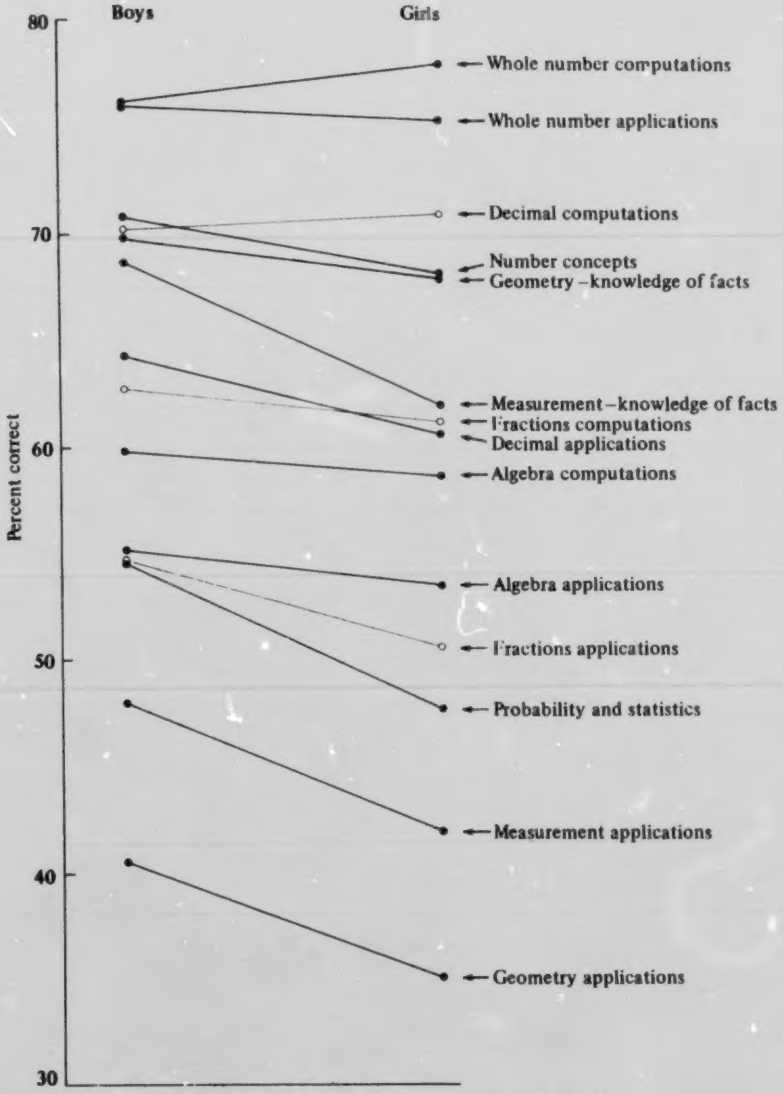


Fig. 14. Mathematics performance of twelfth grade boys and girls who completed general math and first-year algebra

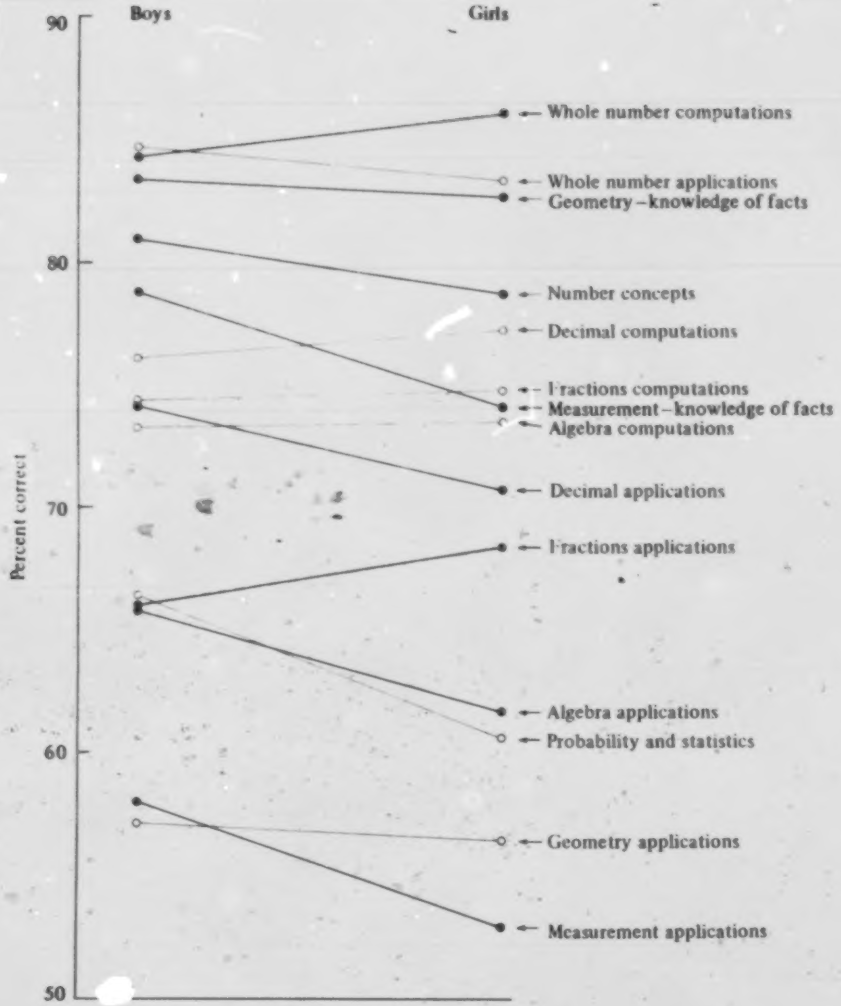


Fig. 15. Mathematics performance of twelfth grade boys and girls who completed general math, first-year algebra, and geometry

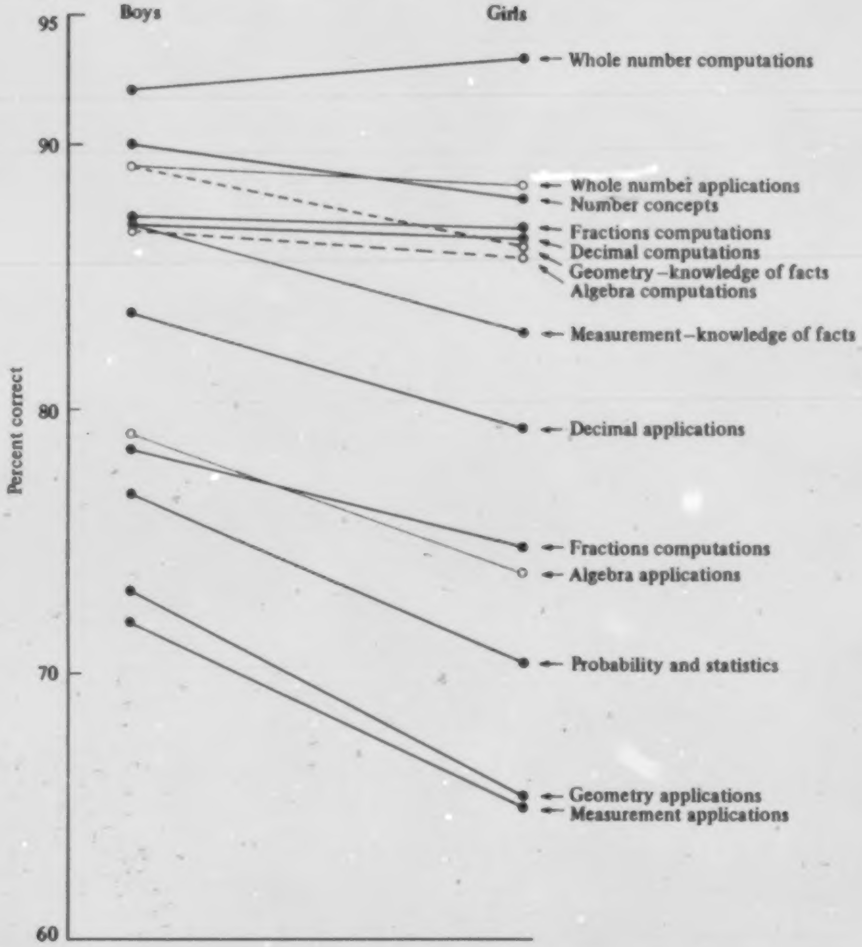


Fig. 16. Mathematics performance of twelfth grade boys and girls who completed general math, first- and second-year algebra, and geometry

VI. Analyses of Achievement for Subgroups of Pupils

In this section of the report, the statewide achievement findings are averaged across all schools according to different student characteristics, such as sex, English language fluency, mobility level, and socioeconomic level. However, for sixth grade students only sex and English language fluency data are available; for twelfth grade students only sex data available. For simplicity, the results are presented sequentially, by grade level.

Some Important Cautions

This chapter contains the relative achievement levels and amount of change over a three-year period for the various types of pupils. The findings must be read with extreme care to avoid conclusions that appear sound on the surface but can be shown to be misleading when additional information is added to the analysis.

First of all, the reader should not attempt to view student characteristics out of context. For instance, in looking at the mobility table, one might conclude that this is a very important factor; however, what makes mobility a relevant variable is its relationship to socioeconomic level, which produces the major differences among students' scores and is directly related to the mobility level of the students. Higher socioeconomic level pupils are less mobile and have higher test scores. A second trap the reader should avoid is that of comparing scores across grades or levels of a given student characteristic. These types of comparisons assume consistent background factors, comparable students, and equivalent group variances. Thus, in this report only students within a characteristic level and grade will be compared.

A Pupil Level Analysis of Achievement and Background Factors
Grades Two and Three

As part of the administration of the Reading Test, teachers provided background information about each pupil. When used with the test results, these data make it possible to compare the performances of groups of pupils with different background characteristics. This section contains an analysis of the effect on pupil performance of four significant background factors: (1) the sex of the pupils; (2) the pupil's English language fluency and possible second language spoken; (3) the socioeconomic level of the pupil's family as determined by the occupational status of the breadwinner in the pupil's family; and (4) the pupil's mobility rate as a function of the grade level at which the pupil first entered the school.

Summary of Findings

The following is a summary of the principal effects of the background factors described above on pupil performance in grades two and three:

Pupil sex. The girls outscored the boys on the Reading Test; but the within-grade margin by which the girls lead the boys has generally narrowed over the last two years on both means and percent scoring below the first quartile. The test achievement of both boys and girls continued to improve in 1977-78.

English fluency. The percent of pupils who spoke only English decreased slightly during the three years covered in this report. The percent of pupils who spoke English and a second language increased slightly. The highest reading test scores were made by pupils who spoke fluent English and a second language (excluding Spanish); students who spoke English only coming in second; and pupils who spoke limited English plus a second language scoring substantially lower than the other two groups. Of the pupils who spoke a second language, Spanish students scored the lowest on the reading test. Lastly, the mean scores of all language groups increased over the last two years.

Socioeconomic level. The occupation of the principal breadwinner in the pupil's family was more closely related to reading test scores than any other factor. On the average the pupils from families at the highest socioeconomic levels achieved the highest scores on the reading tests, with the pupils from the families at the second highest socioeconomic level achieving the second highest scores, and so forth. The same pattern prevails with regard to percent of pupils who scored below the first quartile, with the pupils from the highest socioeconomic group being least represented in the lower quartile while the pupils from the lowest socioeconomic group were the most frequently represented. These trends have been consistent over time; with all groups, excluding unknowns and no-responses, indicating an increase in mean scores over the last two years. Lastly, the within-grade gap between pupils in the highest and lowest socioeconomic groups has generally narrowed over the last two years in both mean scores and the percent scoring below the first quartile.

Pupil mobility. The pupils showed a consistent increase in mobility (that is, a greater tendency to change schools) over the last two years. The less mobile pupils scored higher than more mobile students. Thus, it appears that stability of enrollment is related to reading test achievement. However, one can see in Table 16 that socioeconomic level is by far the most influential factor, since there is no overlap between socioeconomic levels when mobility is included in the analysis. Finally, the gap between the more mobile pupils and the less mobile pupils has narrowed over the last two years in both mean scores and the percent scoring below the first quartile.

Method of Analysis

The reading achievement figures for pupils in grades two and three shown in this section are for 1975-76, 1976-77, and 1977-78. The achievement scores are further broken down to show the comparative scores between students having different background characteristics. For instance, in Table 12 achievement scores of pupils in grades two and three are broken down into scores for boys and girls.

Pupil achievement is expressed in two ways: (1) as the mean reading test score, which is the average percent of correct test answers for the group; and (2) as the percent of students scoring below the first quartile on the reading test, which is the percent of pupils within a student background characteristic group who scored in the bottom 25 percent of all pupils. For instance, in 1977-78 boys in grade three had a mean reading test score of 80.5, which means that they averaged 80.5 percent correct answers on the test (see Table 12). Table 12 also contains the figure 28.3 for grade three boys who scored below the first quartile in the reading test in 1977-78, which means that 28.3 percent of the boys in grade three were in the bottom one-fourth of all third grade pupils tested. Both of these achievement reporting methods aid the reader in interpreting the findings in this report by allowing critical analyses of both the low scoring students and the group as a whole.

Percent below first quartile. Any group of pupils can be divided into the fourths that scored highest, second highest, third highest, and lowest. The first quartile is the score that marks the border between the lowest and the next lowest forth of the pupils who were tested. One can then use this cutting point as a selection criteria to view the performance of various groups as follows. If any pupil subgroup is overrepresented in this scoring category, for instance more than 25 percent, then that subgroup is having a problem with the test.

For example, in Table 12 it can be seen that the boys have a higher percent in the lower scoring group than the girls (that is, 28.1 percent versus 21.9 percent in grade two). This information coincides with the mean score differences between boys and girls (that is, 67.7 percent versus 71.2 percent), an indication that girls perform better on the test and indicates that the differences are more or less consistent across achievement levels.

Sex of the pupils. Teachers were asked to designate the sex of each pupil on the pupil's test booklet as follows:

SEX

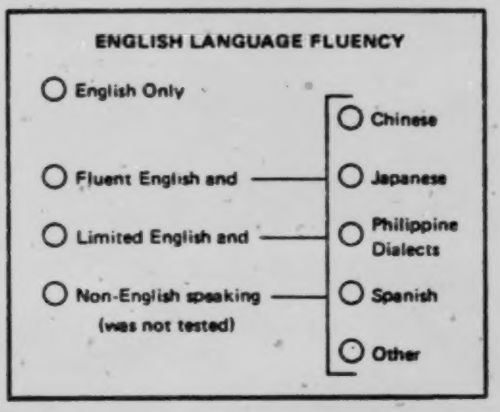
Boy ○

Girl ○

Slightly more boys than girls were tested in 1977-78 in both grades two and three. Both sexes in both grades showed improvements in mean percent correct. Girls in second grade answered an average of 71.2 percent of the questions correctly, an increase of 0.3 percent correct over 1976-77. Girls in third grade answered 83.8 percent of the questions correctly, an improvement of 0.3 percent.

The improvement of the boys was slightly better than that of the girls. Second grade boys averaged 66.7 percent correct, an increase of 0.6 percent over the previous year. In third grade boys answered 80.5 percent of the questions correctly, an improvement of 0.6 percent. More boys than girls scored below the first quartile, and the percent of boys below the first quartile is greater in third grade than in second grade. However, within grades these differences are growing smaller over time.

English language fluency. Teachers were asked to designate the languages that the pupil spoke as follows:



ENGLISH LANGUAGE FLUENCY

○ English Only

○ Fluent English and

○ Limited English and

○ Non-English speaking (was not tested)

○ Chinese

○ Japanese

○ Philippine Dialects

○ Spanish

○ Other

Among the third grade pupils tested, 78.5 percent spoke English only, 14.3 percent spoke fluent English and a second language, 6.0 percent spoke limited English and a second language, and 1.3 percent spoke no English (see Table 13). Spanish was the dominant second language (see Figure 17) a similar distribution was found among second grade pupils. From 1976-77 to 1977-78 fewer students spoke English only and more students spoke fluent or limited English and another language.

Generally, both second and third grade students have increased their mean reading scores over the last two years. The pupils who speak English only performed above the statewide averages (see Table 13): second grade pupils who spoke only English answered 72.7 percent of the questions correctly (compared with the statewide average of 68.9 percent); the third grade pupils who spoke only English answered 85.5 percent of the questions correctly

(82.2 percent is the statewide average). Both second and third grade pupils who spoke fluent English as a second language and whose primary language is other than Spanish achieved even higher scores than pupils who spoke only English (see Figure 18). Particularly high achievement was shown by children who spoke fluent English and Chinese or Japanese. Pupils who spoke fluent English and Spanish scored considerably below the statewide averages, 60.1 percent correct in second grade and 75.6 percent correct in third grade. The average score of speakers of limited English were significantly below the statewide averages.

Occupation of the breadwinner in the pupil's family. Teachers were asked to designate as follows the occupational category of the breadwinner in each pupil's family:

SOCIOECONOMIC STATUS

○ Executives, Professionals, and Managers
○ Semiprofessionals, Clerical and Sales Workers, and Technicians
○ Skilled and Semiskilled Employees
○ Unskilled Employees (and Welfare)
○ Unknown

The occupational information permitted a comparison of pupils' scores by the socioeconomic level of their parents. The results are shown on Table 14 and Figure 19. Generally, all socioeconomic groups, excluding unknowns and no responses, have increased their mean reading scores over the last two years.

Table 14 shows the considerable achievement differences between children of different socioeconomic backgrounds. Children whose parents are in the more professional categories scored the highest in both second and third grades. Similar differences were noted in the percent of pupils who scored below the first quartile. In third grade 5.9 percent of the pupils whose parents were classified as professionals scored below the first quartile. In contrast, almost half (48.7 percent) of those whose parents were classified as unskilled or receiving welfare scored below the first quartile. Thus, a child from the lowest socioeconomic group was about eight times as likely to score below the first quartile as one from the highest socioeconomic group. However, the gap between the top and bottom socioeconomic groups is narrowing over time for both mean scores and percent of students scoring below the first quartile.

Pupil mobility. Teachers were asked to designate the grade in which each child first enrolled in the school as follows:

MOBILITY

AT WHAT GRADE WAS THIS PUPIL FIRST ENROLLED AT THIS SCHOOL?
K ○
1 ○
2 ○
3 ○

HAS THIS PUPIL BEEN ENROLLED IN THIS SCHOOL CONTINUOUSLY SINCE THAT TIME?
Yes ○
No ○

This information permits a comparison of pupil scores by the length of time a pupil has attended his or her current school. The results are shown in Tables 15 and 16. Approximately half the pupils tested had not changed schools since their enrollment in kindergarten: 55 percent of the grade two pupils and 46.3 percent of the grade three pupils. However, about one-fourth of the pupils tested had moved to their current school during the year of testing (25.8 percent of the second graders and 24.2 percent of the third graders).

The mobility rates have continued to increase for both grades over the last two years (see Table 15). The percent of second grade pupils who remained in the same school since kindergarten decreased from 57.1 percent in 1975-76 to 55 percent in 1977-78. Third grade pupils showed a similar decrease in enrollment stability from 48.4 percent to 46.3 percent for the same years. Similarly, more pupils in 1977-78 had been in their current school less than one year at the time of testing than in 1976-77. For second grade pupils this number increased from 25.6 percent in 1976-77 to 25.8 percent in 1977-78. For third graders it rose from 24.1 percent in 1976-77 to 24.2 percent in 1977-78.

Pupils with stable enrollments (that is, longer enrollments at the same school) generally had higher test scores than those who had been in the school a shorter time. Second grade pupils who were enrolled in the same schools since kindergarten scored 70.5 percent correct; those enrolled in the same school since first grade scored 68.2 percent correct; and those enrolled in the same school since second grade scored 66.2 percent correct. The patterns were similar for third graders. Third grade pupils who were in the same schools since kindergarten scored 84 percent correct; those in the same school since first grade scored 82.1 percent correct; and those in the same school since second grade scored 81.3 percent correct; and those enrolled that year scored 79.4 percent correct.

Part of the pattern of higher achievement among the pupils with more stable enrollments can be attributed to the fact that more of these children come from families with higher socieconomic status. This relationship can be seen in Table 16, which includes figures for both socioeconomic status and mobility.

The data summarized in Table 16 indicates that mobility is mildly related to pupil achievement, in that within each socioeconomic category an increase in mobility does correspond to a slight decrease in mean scores. However, the most mobile children of parents classified as executive/professionals still outscored the most stable pupils from the next lower socioeconomic group, and this relationship is consistent for the other socioeconomic groups as well.

Generally, the children of higher mobility made greater achievement gains than the children of more stable backgrounds, as shown in Table 15; thus continuing the closing of the gap between scores of the most and the least mobile groups. For example, second grade children who were enrolled in the same school since kindergarten scored 0.3 percent correct higher than their counterparts of 1976-77, while those who enrolled during the year the test was given gained 0.7 percent over their predecessors. Third grade children who were enrolled in the same school since kindergarten gained 0.4 percent, while those enrolled that year gained 0.6 percent.

Table 12

Reading Test Scores by Sex

Sex	Year	Percent of Population		Mean Test Scores		Change in Means		Percent Scoring Below First Quartile		Change in Percent Scoring Below First Quartile	
		Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3
Boys	1975-76	50.3	49.9	65.2	79.5			28.3	28.5		
	1976-77	50.0	49.8	66.1	79.9	+ .9	+ .4	28.2	28.5	- .1	-0-
	1977-78	50.3	50.0	66.7	80.5	+ .6	+ .6	28.1	28.3	- .1	- .2
Girls	1975-76	49.3	49.6	70.0	83.2			21.6	21.4		
	1976-77	49.1	49.5	70.9	83.5	+ .9	+ .3	21.7	21.4	+ .1	-0-
	1977-78	49.3	49.6	71.2	83.8	+ .3	+ .3	21.9	21.7	+ .2	+ .3

Table 13

Reading Test Scores by English Language Fluency and Other Language Spoken

English Language Fluency	Other Languages Spoken	Year	Percent of Population		Mean Test Score		Change in Means		Percent Scoring Below First Quartile		Change in Percent Scoring Below First Quartile	
			Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3
STATE TOTAL		1975-76	100.0	100.0	67.7	81.4			25.0	25.0		
		1976-77	100.0	100.0	68.4	81.7	+ .7	+ .3	25.0	25.0	-0-	-0-
		1977-78	100.0	100.0	68.9	82.2	+ .5	+ .5	25.0	25.0	-0-	-0-
English		1975-76	79.2	79.3	70.9	84.3			19.8	19.7		
		1976-77	78.7	78.8	72.0	84.3	+1.1	-0-	19.3	19.2	- .5	- .5
		1977-78	78.0	78.5	72.7	85.5	+ .7	+1.2	19.0	19.0	- .3	- .2
Fluent English	Chinese	1975-76	.5	.6	80.5	89.3			8.4	9.9		
		1976-77	.5	.6	81.9	91.1	+1.4	+1.8	5.9	7.4	-2.5	-2.5
		1977-78	.6	.7	81.8	90.4	- .1	- .7	7.5	9.2	+1.6	+1.8
	Japanese	1975-76	.4	.4	82.3	91.7			5.5	6.4		
		1976-77	.4	.4	82.8	91.8	+ .5	+ .1	5.1	6.2	- .4	- .2
		1977-78	.4	.4	84.3	91.9	+1.5	+ .1	5.1	6.7	-0-	+ .5
	Philippine Dialects	1975-76	.7	.7	74.5	85.6			11.7	16.6		
		1976-77	.7	.7	75.6	87.5	+1.1	+1.9	11.7	13.3	-0-	-3.3
		1977-78	.8	.7	77.5	87.7	+1.9	+ .2	9.4	13.5	-2.3	+ .2
	Spanish	1975-76	9.2	10.3	58.1	74.5			36.8	38.3		
		1976-77	9.2	10.5	59.1	75.0	+1.0	+ .5	36.8	38.6	-0-	+ .3
		1977-78	9.4	10.3	60.1	75.6	+1.0	+ .6	36.3	38.8	- .5	+ .2
	Other	1975-76	1.4	1.6	73.0	85.5			16.0	17.3		
		1976-77	1.5	1.6	74.2	86.1	+1.2	+ .6	15.1	16.6	- .9	- .7
		1977-78	1.8	2.0	74.8	86.6	+ .6	+ .5	14.5	17.1	- .6	+ .5
	No Response	1975-76	.2	.2	62.8	79.1			30.9	30.5		
		1976-77	.2	.2	63.3	78.3	+ .5	- .8	33.9	33.1	+3.0	+2.6
		1977-78	.2	.2	64.8	78.0	+1.5	- .3	29.6	31.7	-4.3	-1.4
	Sub-Total	1975-76	12.4	13.8	62.5	77.5			30.8	32.6		
		1976-77	12.4	13.9	63.5	78.1	+1.0	+ .6	30.6	32.5	- .2	- .1
		1977-78	13.0	14.3	64.8	78.8	+1.3	+ .7	29.5	32.2	-1.1	- .3

Table 13 (Cont.)

Limited English	Chinese	1975-76	.2	.2	56.5	70.7			38.3	45.9		
		1976-77	.2	.2	60.2	71.9	+3.7	+1.2	35.9	46.2	-2.4	+ .3
		1977-78	.2	.2	61.6	74.4	+1.4	+2.5	31.1	42.2	-4.8	-4.0
	Japanese	1975-76	.1	a	65.9	77.2			22.8	34.1		
		1976-77	.1	.1	66.1	78.3	+ .2	+1.1	23.6	32.1	+ .8	-2.0
		1977-78	.1	.1	69.7	78.3	+3.6	-0-	18.3	34.2	-5.3	+2.1
	Philippine Dialects	1975-76	.2	.2	57.0	70.4			37.8	46.6		
		1976-77	.2	.2	60.0	71.6	+3.0	+1.2	34.0	45.5	-3.8	-1.1
		1977-78	.2	.2	61.9	74.2	+1.9	+2.6	32.5	43.3	-1.5	-2.2
	Spanish	1975-76	5.1	4.1	42.1	54.5			67.3	74.3		
		1976-77	5.8	4.7	42.3	53.8	+ .2	- .7	68.0	76.6	+ .7	+2.3
		1977-78	6.0	4.9	42.2	54.7	- .1	+ .9	69.5	75.7	+1.5	- .9
	Other	1975-76	.5	.5	50.4	59.5			48.9	68.0		
		1976-77	.6	.6	53.3	63.6	+2.9	+4.1	45.7	60.7	-3.2	-7.3
		1977-78	.7	.6	54.2	65.6	+ .9	+2.0	46.4	58.6	+ .7	-2.1
	No Response	1975-76	.1	.1	46.4	57.4			62.1	68.1		
		1976-77	.1	.1	42.8	58.3	-3.6	+ .9	68.7	69.7	+6.6	+1.6
		1977-78	.1	.1	47.2	58.9	+4.4	+ .6	57.9	69.9	-10.8	+ .2
	Sub-Total	1975-76	6.2	5.0	44.1	56.4			63.3	71.3		
		1976-77	7.0	5.7	44.6	56.2	+ .5	- .2	63.6	72.6	+ .3	+1.3
		1977-78	7.2	6.1	44.8	57.2	+ .2	+1.0	64.6	71.6	+1.0	-1.0
Non-English Speaking		1975-76	1.4	1.1	29.1[b]	29.1[b]			100.0[b]	100.0[b]		
		1976-77	1.5	1.1	29.1[b]	29.1[b]	-0-	-0-	100.0[b]	100.0[b]	-0-	-0-
		1977-78	1.7	1.3	29.1[b]	29.1[b]	-0-	-0-	100.0[b]	100.0[b]	-0-	-0-
No Response		1975-76	.8	.8	68.6	81.1			23.2	25.4		
		1976-77	.4	.5	68.9	82.5	+ .3	+1.4	22.8	23.4	- .4	-2.0
		1977-78	a	a	62.0	82.4	-6.9	- .1	37.5	25.3	+14.7	+1.9

[a] Value less than .05

[b] The computed chance score for pupils who were unable to take the test

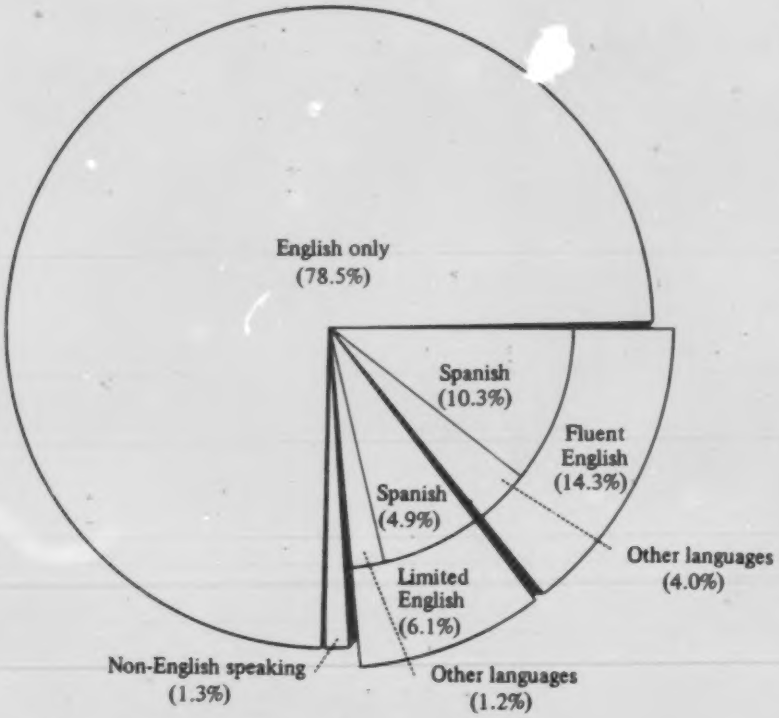


Fig. 17. **Distribution of California third grade pupils according to English language fluency and other language spoken, as coded by their teachers**

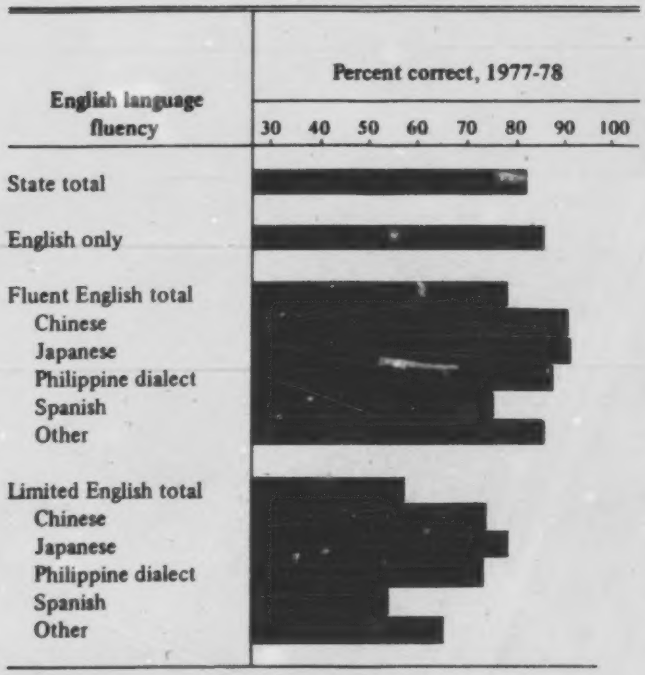


Fig. 18. *Reading Test* scores by English language fluency and other language spoken, grade three

Table 14

Reading Test Scores by Occupation of Principal Breadwinner in Pupil's Family

Occupation of Principal Breadwinner	Year	Percent of Population		Mean Test Score		Change in Means		Percent Scoring Below First Quartile		Change in Percent Scoring Below First Quartile	
		Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3
STATE TOTAL	1975-76	100.0	100.0	67.7	81.4			25.0	25.0		
	1976-77	100.0	100.0	68.4	81.7	+ .7	+ .3	25.0	25.0	-0-	-0-
	1977-78	100.0	100.0	68.9	82.2	+ .5	+ .5	25.0	25.0	-0-	-0-
Executive, Professional or Manager	1975-76	15.3	15.9	83.0	91.9			6.1	6.1		
	1976-77	15.7	16.5	83.7	92.1	+ .7	+ .2	6.0	6.2	- .1	+ .1
	1977-78	15.1	16.3	84.4	92.4	+ .7	+ .3	5.6	5.9	- .4	- .3
Semiprofessional, Clerical, Sales Worker, or Technician	1975-76	21.3	21.8	75.8	87.8			12.5	12.8		
	1976-77	20.9	21.5	76.6	88.1	+ .8	+ .3	12.4	12.6	- .1	- .2
	1977-78	21.1	22.1	77.1	88.5	+ .5	+ .4	12.4	13.0	-0-	+ .4
Skilled or Semiskilled Employee	1975-76	36.5	36.8	66.0	81.0			25.4	25.4		
	1976-77	36.3	36.4	67.1	81.4	+1.1	+ .4	25.2	25.5	- .2	+ .1
	1977-78	36.5	36.2	67.7	81.9	+ .6	+ .5	25.0	25.6	- .2	+ .1
Unskilled Employee	1975-76	19.3	18.1	52.9	68.1			47.6	49.7		
	1976-77	19.1	18.2	53.8	68.7	+ .9	+ .6	47.6	49.4	-0-	- .3
	1977-78	19.1	17.6	54.6	69.6	+ .8	+ .9	47.1	48.7	- .5	- .7
Unknown	1975-76	6.2	5.9	56.6	71.5			41.9	42.7		
	1976-77	6.6	6.0	56.8	71.5	+ .2	-0-	43.0	43.2	+1.1	+ .5
	1977-78	6.7	6.3	56.8	70.7	-0-	- .8	44.2	45.7	+1.2	+2.5
No Response	1975-76	1.3	1.5	65.9	80.3			27.1	26.7		
	1976-77	1.4	1.4	65.6	79.2	- .3	-1.1	28.8	29.5	+1.7	+2.8
	1977-78	1.6	1.6	63.2	79.0	-2.4	- .2	33.6	30.8	+4.8	+1.3

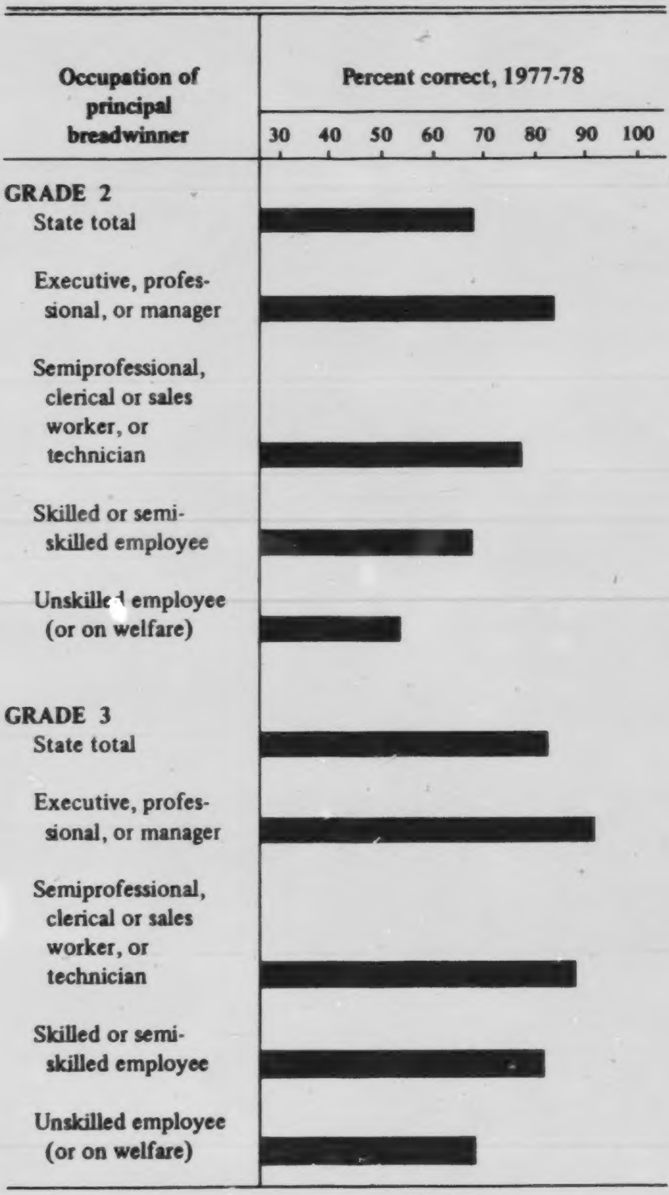


Fig. 19. ***Reading Test*** **scores by occupation of principal breadwinner in pupil's family, grades two and three**

Table 15

Reading Test Scores by Mobility Rate

Grade in Which Pupil Was Enrolled in School of Testing	Year	Percent of Population		Mean Test Score		Change in Means		Percent Scoring Below First Quartile		Change in Percent Scoring Below First Quartile	
		Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3	Grade 2	Grade 3
STATE TOTAL	1975-76	100.0	100.0	67.7	81.4			25.0	25.0		
	1976-77	100.0	100.0	68.4	81.7	+ .7	+ .3	25.0	25.0	-0-	-0-
	1977-78	100.0	100.0	68.9	82.2	+ .5	+ .5	25.0	25.0	-0-	-0-
Kindergarten	1975-76	57.1	48.4	69.4	83.4			22.0	21.5		
	1976-77	56.1	47.7	70.2	83.6	+ .8	+ .2	22.3	21.7	+ .3	+ .2
	1977-78	55.0	46.3	70.5	84.0	+ .3	+ .4	22.6	22.0	+ .3	+ .3
Grade 1	1975-76	17.1	13.1	66.2	81.3			27.1	25.0		
	1976-77	17.5	12.6	67.3	81.3	+1.1	-0-	26.6	25.9	- .5	+ .9
	1977-78	18.3	13.0	68.2	82.1	+ .9	+ .8	26.0	25.4	- .6	- .5
Grade 2	1975-76	24.7	14.3	64.3	80.2			30.3	27.0		
	1976-77	25.6	14.8	65.5	80.6	+1.2	+ .4	29.7	27.0	- .6	-0-
	1977-78	25.8	15.7	66.2	81.3	+ .7	+ .7	29.2	26.4	- .5	- .6
Grade 3	1975-76		23.2		77.9				30.8		
	1976-77		24.1		78.8		+ .9		29.7		-1.1
	1977-78		24.2		79.4		+ .6		29.6		- .1
No Response	1975-76	1.1	.9	64.4	76.5			28.8	34.0		
	1976-77	.8	.8	65.6	78.6	+1.2	+2.1	30.1	31.5	+1.3	-2.5
	1977-78	.8	.8	65.1	78.8	- .5	+ .2	30.8	31.1	+ .7	- .4

Table 16

Statewide Mean Scores on Reading Test, by Socioeconomic Status and Mobility Rate, Grade Three 1977-78

Occupation of principal breadwinner	Grade in which pupil was enrolled in school where tested	Percent of pupils by grade level	Percent scoring below first quartile	Mean *Reading Test* score
		1977-78	1977-78	1977-78
Executive, professional, or manager	Kindergarten	51.6	4.8	93.0
	Grade 1	13.5	6.1	92.5
	Grade 2	15.2	6.7	92.1
	Grade 3	19.7	8.1	91.0
Semiprofessional, clerical, sales worker, or technician	Kindergarten	47.6	11.6	89.2
	Grade 1	13.3	13.3	88.5
	Grade 2	16.0	13.3	88.3
	Grade 3	23.1	15.3	87.3
Skilled or semiskilled employee	Kindergarten	48.2	24.2	82.8
	Grade 1	12.5	26.0	81.7
	Grade 2	15.7	26.0	81.5
	Grade 3	23.6	27.8	80.5
Unskilled employee or on welfare	Kindergarten	41.6	44.5	72.3
	Grade 1	13.6	49.5	69.5
	Grade 2	16.2	51.7	67.8
	Grade 3	28.5	52.7	66.7

Student Level Analysis of Achievement and Background Factors, Grades Six and Twelve

As part of the administration of the Survey of Basic Skills, sixth grade teachers provided information on the English language fluency of each student and any second language that the student spoke. Both sixth and twelfth grade teachers also provided information on the sex of the student. These factors were then analyzed to determine whether any differences exist between students grouped by these characteristics.

Summary of Findings

1. Reading and math test scores were higher for students who spoke fluent English plus either Chinese or Japanese than for those who spoke English only. Students who spoke limited English scored far below the others. The reading test scores of all students, except those who spoke limited English plus Japanese, increased from last year; and mathematics scores increased for all the groups. Lastly, the gap between the students who spoke English only and those who spoke a second language decreased since last year.

2. Both boys and girls increased their reading and mathematics scores from last year in grade six, but reading scores decreased for twelfth grade students. The gap between the boys and the girls narrowed in reading in both sixth and twelfth grades.

Analysis of Findings

English language fluency. Figure 20 contains the percents of pupils that fell within the various categories of fluency in English and the percents of students who spoke other languages. The reading and mathematics scores, by fluency in English and any other language that the student spoke are presented in Table 17 and are shown graphically in Figure 20.

Overall reading scores increased by 0.4 percent correct between 1976-77 and 1977-78. The data for reading shows that all students more or less followed the statewide trend--except limited English pupils who spoke Japanese, whose score declined. The biggest gains were made by students who spoke a second language, narrowing the gap in mean scores between the English only students and those who spoke a second language.

Overall mathematics scores increased by 0.8 percent between 1976-77 and 1977-78, and this instituted an increase in all categories. Parallel to reading, fluent-English-speaking students who spoke Chinese, Japanese, or a Philippine dialect scored above the English only students. Further, in the area of mathematics even the limited-English-speaking students who spoke Chinese or Japanese scored above the English-only students. This seems logical since one could view mathematics as a somewhat language independent subject matter.

Sex differences. Both reading and mathematics scores in sixth grade increased from last year (see Table 18). In twelfth grade, reading scores declined from last year, with girls declining the most; reducing the gap between the sexes in reading. However, in mathematics there were no changes from last year: boys continue to score above girls, and quite substantially so at grade twelve.

Table 17

Survey of Basic Skills Scores for Reading and Mathematics by English Language Fluency
Grade Six
1975-76, 1976-77, and 1977-78

English Language Fluency	Other Language Spoken	Percent of Pupils	Reading					Mathematics				
			1975-76	1976-77	1977-78	Change 75-6 to 76-7	Change 76-7 to 77-8	1975-76	1976-77	1977-78	Change 75-6 to 76-7	Change 76-7 to 77-8
State Total		100.0[a]	66.1	65.9	66.3	- .2	+ .4	57.4	57.7	58.5	+ .3	+ .8
English Only		75.2	68.2	68.2	68.6	-0-	+ .4	58.5	59.1	59.7	+ .6	+ .6
Fluent English	Total	14.7	58.6	58.5	59.6	- .1	+1.1	52.2	53.0	54.5	+ .8	+1.5
	Chinese	.6	73.4	73.9	75.5	+ .5	+1.6	69.3	71.0	72.9	+1.7	+1.9
	Japanese	.3	76.6	76.2	78.0	- .4	+1.8	68.9	69.5	70.3	+ .6	+ .8
	Philippine Dialect	.7	64.3	64.9	67.8	+ .6	+2.9	58.0	59.0	61.6	+1.0	+2.6
	Spanish	10.8	55.7	55.5	56.3	- .2	+ .8	49.3	50.0	51.2	+ .7	+1.2
	Other	2.0	66.3	65.7	66.7	- .6	+1.0	58.8	60.6	61.4	+1.8	+ .8
Limited English	Total	3.7	38.7	37.8	39.2	- .9	+1.4	43.2	43.3	44.3	+ .1	+1.0
	Chinese	.1	43.9	43.4	44.4	- .5	+1.0	60.0	59.4	61.4	- .6	+2.0
	Japanese	.0	44.5	52.3	48.8	+7.8	-3.5	60.9	66.1	72.7	+5.2	+6.6
	Philippine Dialect	.1	44.4	47.2	49.5	+2.8	+2.3	48.5	47.5	50.2	-1.0	+2.7
	Spanish	2.9	38.0	36.7	37.9	-1.3	+1.2	40.6	40.6	41.6	-0-	+1.0
	Other	.5	39.4	39.1	43.5	- .3	+4.4	52.8	52.5	54.5	- .3	+2.0

[a] Includes .9 percent who were identified as non-English speaking and 6.3 percent non-response.

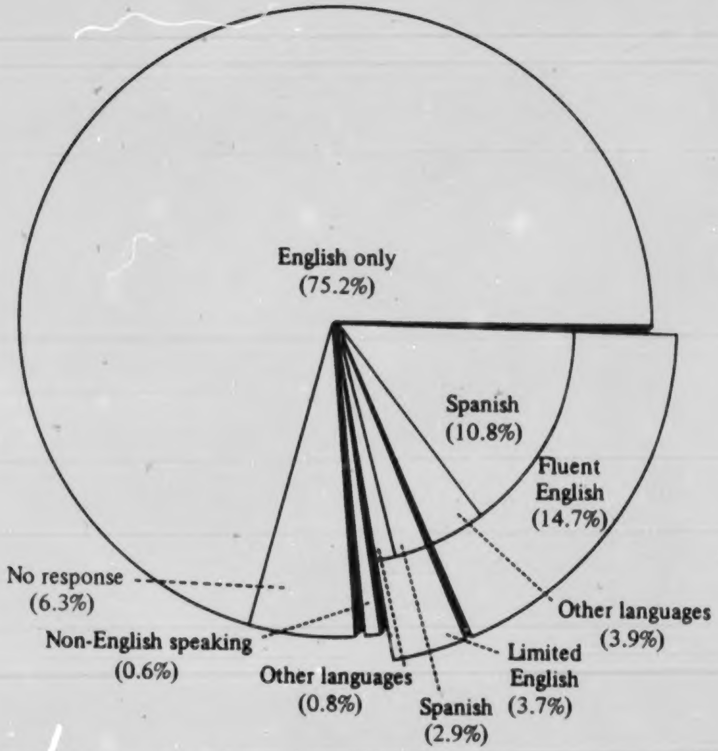


Fig. 20. **Distribution of California grade six students according to English language fluency and other language spoken, as coded by their teachers**

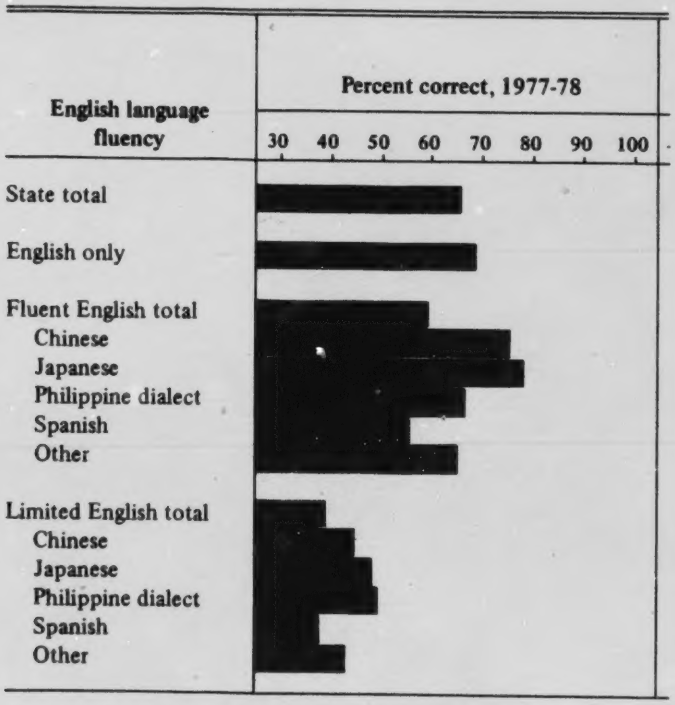


Fig. 21. ***Survey of Basic Skills*** **reading scores by English language fluency and other language spoken, grade six, 1976-77 and 1977-78**

Table 18

Survey of Basic Skills Scores for Reading and Mathematics by Sex
Grades Six and Twelve
1975-76, 1976-77, 1977-78

Sex	Grade Six										Grade Twelve									
	Reading					Mathematics					Reading					Mathematics				
				Change					Change					Change					Change	
	75-6	76-7	77-8	75-6 to 76-7	76-7 to 77-8	75-6	76-7	77-8	75-7 to 76-7	76-7 to 77-8	75-6	76-7	77-8	75-6 to 76-7	76-7 to 77-8	75-6	76-7	77-8	75-6 to 76-7	76-7 to 77-8
State Total	66.1	65.9	66.3	- .2	+ .4	57.4	57.7	58.5	+ .3	+ .8	64.1	63.6	63.3	- .5	- .3	67.0	66.3	66.3	- .7	-0-
Boys[a]	64.7	64.5	65.0	- .2	+ .5	57.5	57.9	58.7	+ .4	+ .8	64.0	63.4	63.3	- .6	- .1	69.4	68.7	68.7	- .7	-0-
Girls[b]	67.7	67.2	67.6	- .5	+ .4	57.2	57.5	58.3	+ .3	+ .8	64.3	63.8	63.4	- .5	- .4	64.0	63.9	63.9	- .1	-0-

[a] Boys represent 50.5 percent of the students tested in grade six and 49.5 percent of the students tested in grade twelve.

[b] Girls account for 49.5 percent of the students tested in grade six and 50.5 percent of the students tested in grade twelve.

VII. Comparisons with National Norms

Some of the difficulties in using publishers' national norms to judge the adequacy of the performance of California students are discussed in Chapter II. Briefly, the two main problems are (1) lack of agreement among publishers' samples; and (2) lack of timeliness. Any comparison based on a single publisher's norm group (a national sample of students tested at a given time) can be quite misleading and is a tenuous undertaking at best. Since no test is given nationwide, one must rely on various publishers' estimates of the nationwide distribution of test scores. These estimates vary from publisher to publisher and are clearly "guesstimates." Part of the problem in establishing norms is that publishers are dependent upon the goodwill and cooperation of the districts they select to administer their tests. When the districts that have been carefully selected as part of a national sample decline to participate in the norming study, the results become that much more uncertain. In addition, because of the expense involved, publishers are not able to update their norms more than once every five to eight years.

To cope with this situation, the Department of Education compares the performance of California students with the norms of a variety of tests and updates the comparisons whenever the tests are renormed or when new tests become available. This is done by giving a sample of California students both the publisher's standardized test and the California test. In some cases no extra testing is required. Scores for a publisher's standardized test are simply collected from the school districts that administered the test to all of their students in certain schools for other purposes. The statistical techniques used to equate the two tests are briefly described in Appendix H. The result of this type of "equating study" is to show how California students would have compared to a national norm group if, in fact, all California students had taken the published test.

This approach has several advantages: (1) the national comparisons are more timely since they can be updated as new norms become available; (2) the estimates are more stable since they do not depend on the representativeness of a single publisher's sample; and (3) the progress of California students can be assessed with a test that fits the objectives of the instructional program and simultaneously, with no additional testing, can be compared to national norms.

The new comparisons presented in this report are based on the tests with the most recent national norms available. This report also contains the results of earlier equating studies so that the reader can inspect the long-term (from eight to twelve years) achievement test trends in California against the backdrop of national norms.

Grades Two and Three

Table 19 contains the estimated national percentile ranks of the medians of California second and third grade pupils' performance on the Reading Test since 1965-66. The trend over the years is clearly one of growth, with the second grade scores increasing from the 28th to the 38th percentile rank on the Stanford Reading Test, from the 50th to the 53rd on the Cooperative Primary Reading Test, and now from the 54th to the 55th on the Comprehensive Tests of Basic Skills (CTBS). Similarly, third grade performance climbed from the 34th percentile to the 57th percentile. Figure 22 is a pictorial display of these trends.

The following observations should help the reader understand more fully the national comparisons.

1. The second grade results for 1965-66 through 1969-70 and the third grade results for 1966-67 through 1970-71 were based on the Stanford Reading Test which was administered to all pupils at those grade levels in California. The norms for the Stanford Reading Test were established in 1963. Thus, the gains that occurred each year are relative to those norms.

2. The second grade results for 1970-71 through 1972-73 and the third grade results for 1971-72 and 1972-73 were based on the Cooperative Primary Reading Test (CPRT), which was administered to all pupils at those grade levels in California. The norms for the CPRT were established in 1966. The dramatic increase of scores in the changeover years was due largely to the great differences between the norms of the Stanford Reading Test and those of the CPRT.

3. In 1973-74 the California Assessment Program developed the Reading Test. A systematic sample of one-ninth of all students tested in grades two and three was used in an equating study to estimate the performance of the median pupil in California relative to 1966 Cooperative Primary Reading Test norms. The results indicated little change from those of the previous year.

4. In 1974-75 the Reading Test was revised and administered to all second and third grade pupils in California. The same test was used in 1975-76, 1976-77, and 1977-78. The results of an equating study, described in Appendix H, were used to estimate the performance of California pupils in comparison to the norms established in 1973 for the Comprehensive Tests of Basic Skills, (CTBS), Form S. As a result of the modest increases over the last three years, the median for California pupil performance in grades two and three in 1977-78 was at the 55th and 57th percentiles, respectively, based on the CTBS 1973 norms.

Grade Six

The performance of sixth graders in California declined in the early 1970s and leveled off in 1974. It has climbed steadily since then. Table 20 shows that the median California sixth grade student's performance in 1977-78 was slightly above the national sample tested in 1973 by the makers of the Comprehensive Tests of Basic Skills. Figure 23 is a graphic representation of these trends. Reading performance, with a percentile rank of 55, continued to be slightly higher than that of language (51) and mathematics (53).

A more complete description of these findings is given below:

1. From 1969-70 to 1973-74 the Comprehensive Tests of Basic Skills (Form Q, 1968 norms) was administered to all California sixth grade students. During this period the performance of California students declined from four to nine percentile ranks on the basis of the 1968 norms.

2. In 1974-75 the first version of the California Assessment Program test, the Survey of Basic Skills, was administered statewide. An equating study that was conducted that year showed that scores had improved and that if the Comprehensive Tests of Basic Skills had been administered statewide, the percentile ranks would have gone up to 48, 43, and 44 for reading, language, and mathematics respectively.

3. A revision of the Survey was administered in 1975-76, 1976-77, and 1977-78. An equating study, described in Appendix H, showed that on the basis of the 1973 version of the CTBS, California students improved enough in 1975-76 to equal or exceed the national average in reading and mathematics. Following the upward trend of 1976-77, in 1977-78 the reading score percentile rank moved up to 55, and the improvement in language and mathematics achievement boosted the percentile ranks to 51 and 53, respectively.

Grade Twelve

The performance of twelfth grade students in California has been declining consistently since testing began in 1969-70. By 1976-77 the median high school senior was at the 42nd, 33rd, and 43rd percentile ranks in reading, written expression, and mathematics, respectively, on the basis of the Iowa Test of Educational Development with its 1962 norms. On the basis of tests with more recent norms the ranks were even lower (see Table 21).

Results for 1977-78 were mixed. Reading continued to decline with percentile ranks of 42, 32, and 35 for the three tests used to establish national comparisons. An improvement in written expression scores brought the percentile rank to 34, 26, and 28. Mathematics held steady at 43, 41, and 43.

Table 19

Estimated National Percentile Ranks of Median California Pupil Performance 1965-66 through 1977-78 Grades Two and Three

Grade	Test administered												
	Stanford Reading Test					Cooperative Primary Reading Test			Reading Test[a]	Reading Test[b] (Revised)			
	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Grade 2	28	30	32	36	33	50	53	53	53	54	54	55	55
Grade 3	NA[c]	34	34	36	36	38	52	52	52	55	55	56	57
Norms:	Stanford, 1963 norms						CPRT, 1966 norms			CTBS, 1973 norms			

[a] The new California test, the Reading Test, was administered in 1973-74. The percentile ranks are based on an equating of the Reading Test and the Cooperative Primary Reading Test, Forms 23A and 23B, normed in 1966.

[b] The revised Reading Test was administered to all California pupils in 1974-75, 1975-76, 1976-77, and 1977-78. The percentile ranks are based on equating studies of the revised Reading Test and the Comprehensive Tests of Basic Skills, Form S, normed in 1973.

[c] Testing did not begin in grade three until 1967.

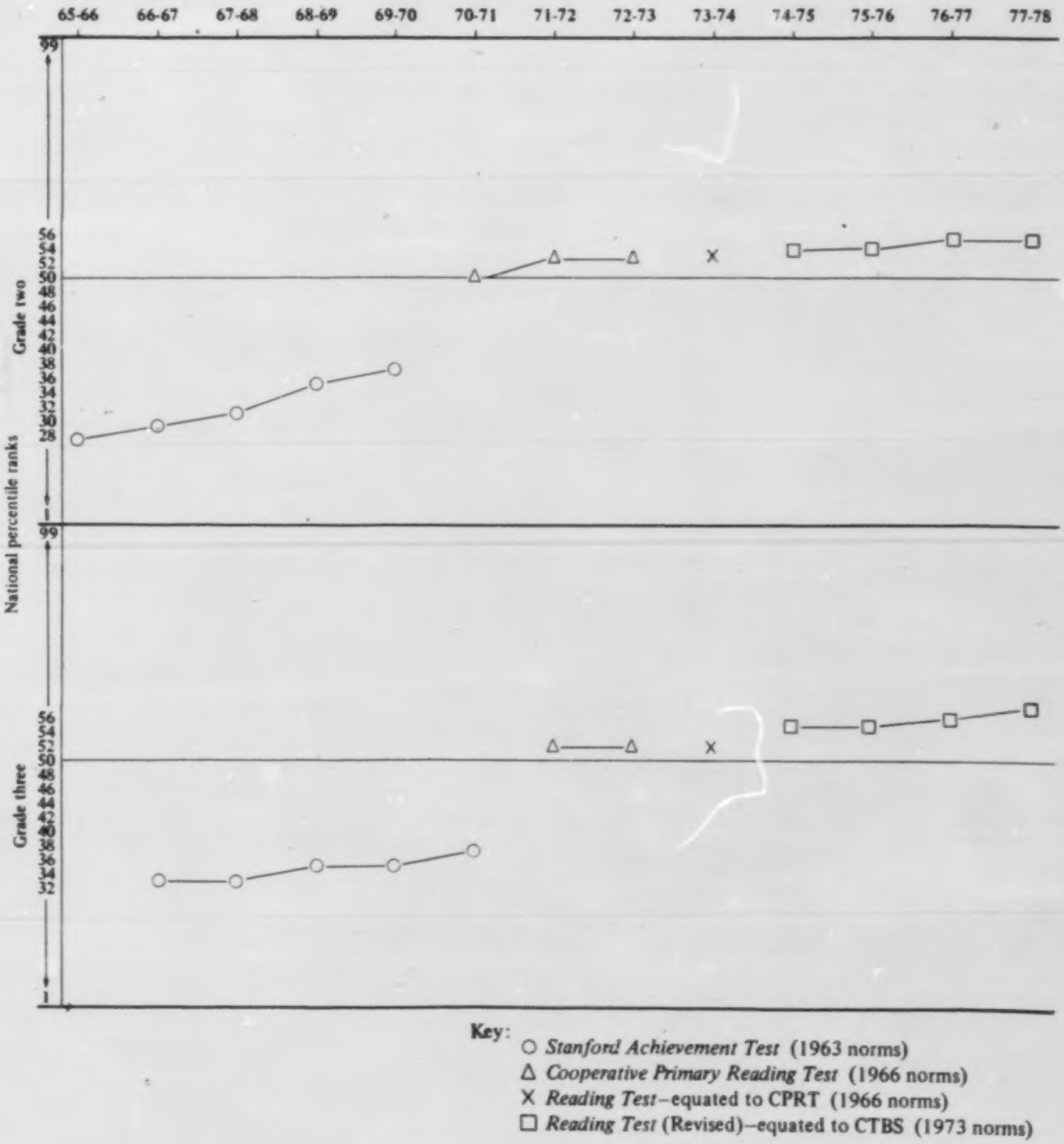


Fig. 22. National percentile ranks of median California pupil performance, 1965-66 through 1976-77, grades two and three

Table 20

Estimated National Percentile Ranks of Median California Student Performance
1969-70 through 1977-78
Grade Six

Content area	Test administered								
	Comprehensive Tests of Basic Skills					Survey of Basic Skills[a]	Survey of Basic Skills[b] (Revised)		
	1969-70	1970 71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Reading	48	46	44	44	44	48	53	53	55
Language	43	43	39	39	37	43	49	51	51
Mathematics	47	43	38	38	38	44	50	51	53
Norms:	CTBS, 1968 norms						CTBS, 1973 norms		

[a] The new California test, the Survey of Basic Skills: Grade Six, was first administered to all California pupils in 1974-75. The percentile ranks are based on an equating of the Survey of Basic Skills and the Comprehensive Tests of Basic Skills (CTBS), Form Q, which was normed in 1968.

[b] The revised version of the Survey of Basic Skills: Grade Six was administered in 1975-76, 1976-77, and 1977-78. The percentile ranks are based on an equating of the revised Survey of Basic Skills and the Comprehensive Tests of Basic Skills (CTBS), Form S, 1973 edition.

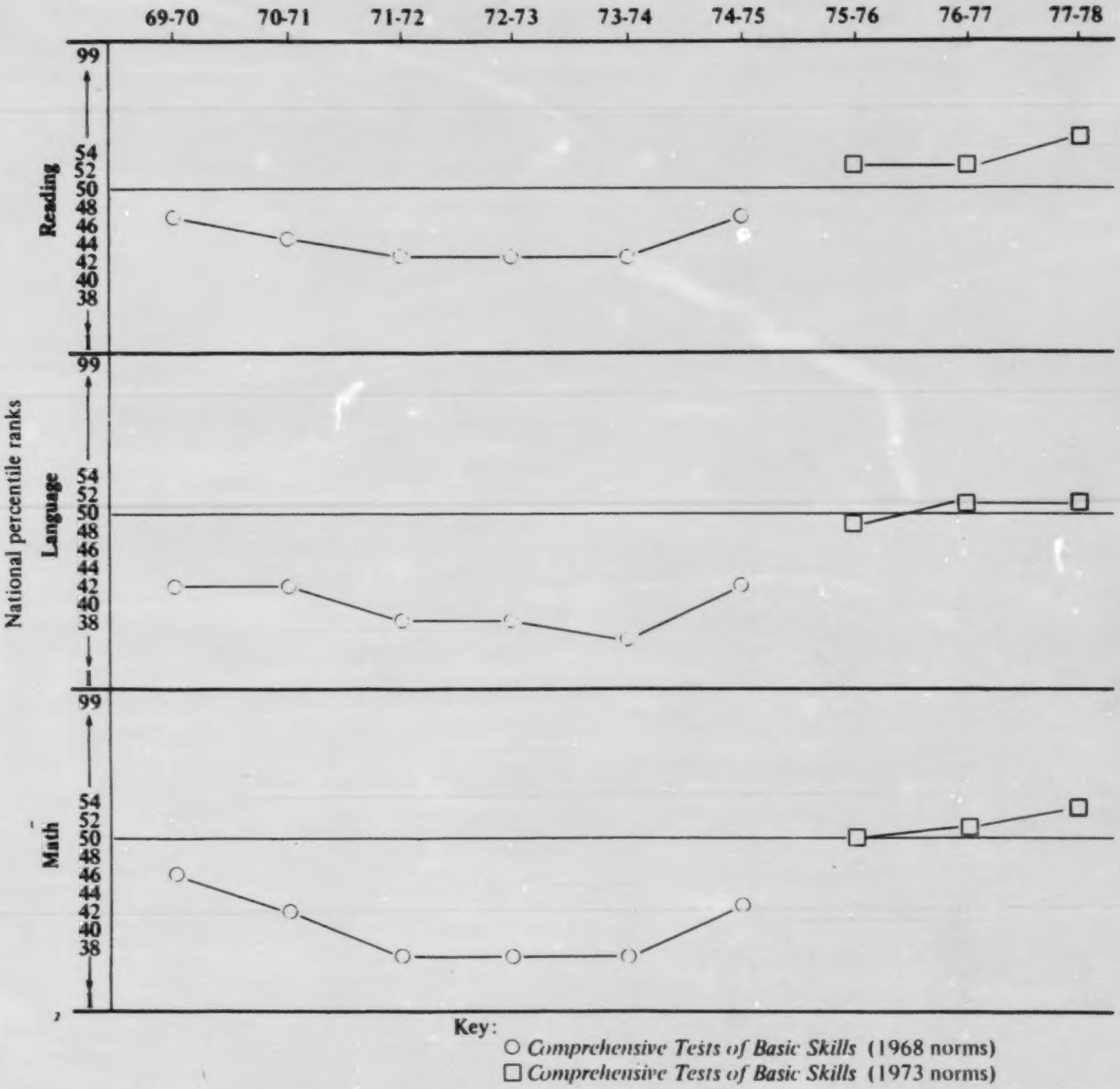


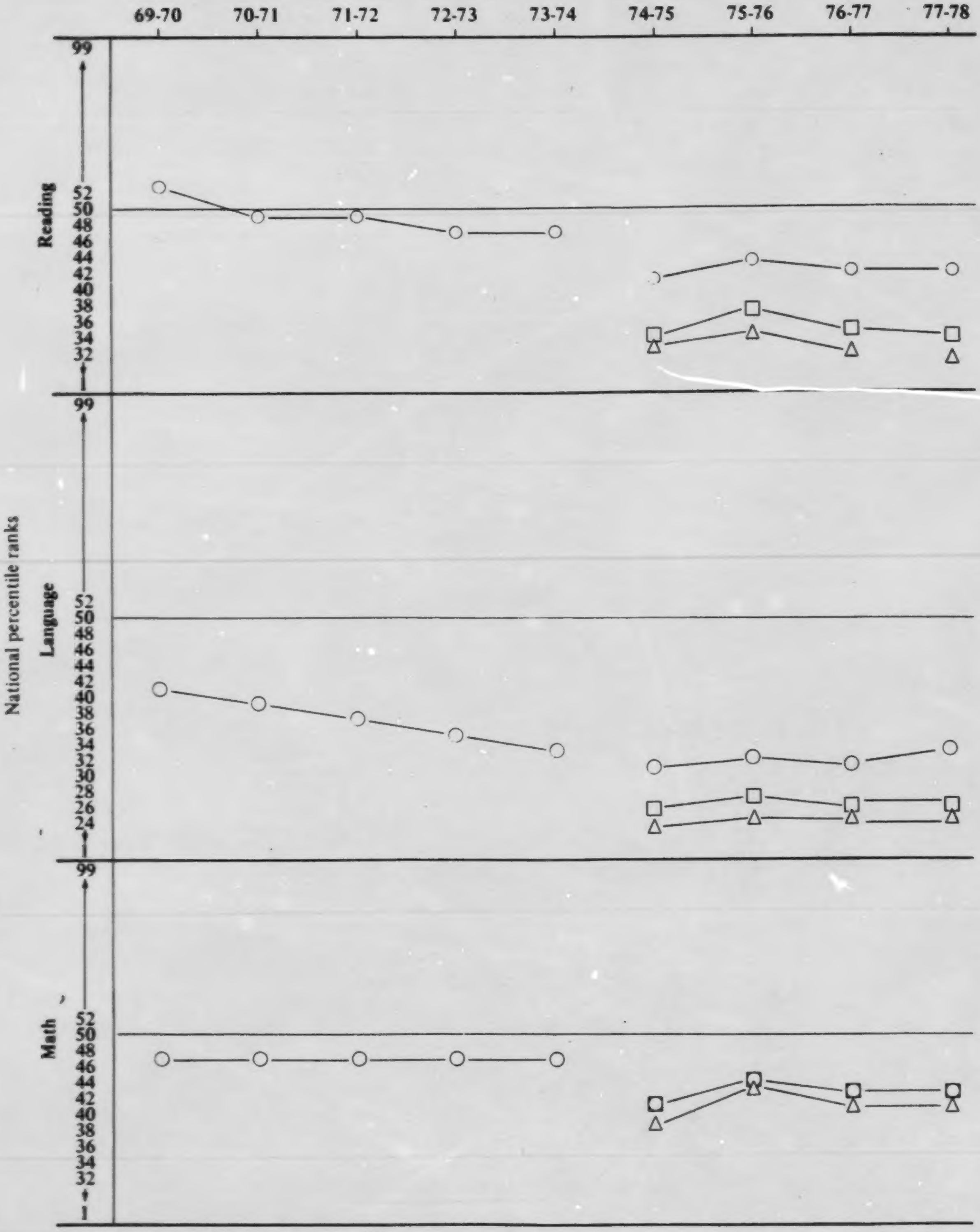
Fig. 23. National percentile ranks of median California pupil performance, 1969-70 through 1977-78, grade six

Table 21

Estimated National Percentile Ranks of Median California Student Performance
1969-70 through 1977-78
Grade Twelve

Content area	Test administered								
	Iowa Tests of Educational Development Form X, Normed in 1962					Survey of Basic Skills[a]	Survey of Basic Skills[a] (Revised)		
	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78
Reading									
ITED, 1962 norms	52	49	49	47	47	41	43	42	42
TAP, 1970 norms						33	35	33	32
STEP, 1970 norms						34	38	36	35
Language									
ITED, 1962 norms	42	40	38	36	34	32	34	33	34
TAP, 1970 norms						25	27	26	26
STEP, 1970 norms						27	29	28	28
Mathematics									
ITED, 1962 norms	48	48	48	48	48	41	44	43	43
TAP, 1970 norms						38	43	41	41
STEP, 1970 norms						41	44	43	43

[a] The new California test, the Survey of Basic Skills: Grade Twelve was administered to all California students from 1974-75 through 1977-78. The percentile ranks are based on equating studies of the Survey of Basic Skills and three other tests with national norms: (1) Iowa Tests of Educational Development, Form X-4, normed in 1962; (2) Tests of Academic Progress, normed in 1970; and (3) Sequential Tests of Educational Progress, Series II, normed in 1970.



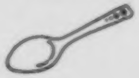
Key:
○ *Iowa Tests of Educational Development* (1962 norms)
□ *Sequential Tests of Educational Progress, Series II* (1970 norms)
△ *Tests of Academic Progress* (1970 norms)

Fig. 24. National percentile ranks of median California pupil performance, 1969-70 through 1976-77, grade 12

Appendixes

APPENDIX A

Reading Performance, by Skill Area, of California Second- and Third-Grade Pupils, 1974-75, 1975-76, 1976-77, and 1977-78

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]								Illustrative test question[2]
			Grade two				Grade three				
			1974-5	1975-6	1976-7	1977-8	1974-5	1975-6	1976-7	1977-8	
TOTAL READING TEST		(250)	(67.6)	(67.7)	(68.4)	* (68.9)	(81.3)	(81.4)	(81.7)	* (82.2)	
I. WORD IDENTIFICATION	(Total and averages for word identification skill areas)	(60)	(75.4)	(75.5)	(76.2)	(76.5)	(85.8)	(85.6)	(85.9)	(86.3)	
A. Sight words	The pupil must choose the word that names the object which is pictured.	5	83.9	84.5	85.4	85.9	92.7	92.6	92.9	93.5	Teacher says: "Mark the word that goes best with the picture."  0 spool 0 spoon 0 stool
B. Phonetic analysis	(Total and averages for phonetic analysis skill area, a subcategory of word identification)	(45)	(76.5)	(76.5)	(77.1)	(77.4)	(86.1)	(85.9)	(86.2)	(86.5)	
1. Consonants	The pupil must choose the word that has a letter that is not sounded.	15	73.9	73.9	74.8	75.1	84.5	83.8	84.2	84.6	Teacher says: "Mark the word that has a letter that is not sounded." 0 right 0 lift 0 spent
2. Vowels	The pupil must choose the printed word that has the same vowel sound as the oral stimulus word.	20	80.3	80.3	81.0	81.4	87.8	88.1	88.2	88.6	Teacher says: "Mark the word that has the same vowel sound in its middle as the vowel sound in the word run." 0 cut 0 ran 0 fin

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[1] The only values presented in this column are averages. The percentages for individual items varied from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

* These values include the fixed score assigned to non-English speaking pupils, as in past years; excluding those pupils raises the statewide averages to 69.6 and 82.8 for grades two and three, respectively.

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]								Illustrative test question[2]
			Grade two				Grade three				
			1974-5	1975-6	1976-7	1977-8	1974-5	1975-6	1976-7	1977-8	
3. Spelling patterns	The pupil must choose the printed word that rhymes with the oral stimulus word.	10	72.9	72.7	72.8	72.8	84.9	84.9	85.1	85.0	Teacher says: "Mark the word that rhymes with the underlined word." show O blow O down O cow
C. Structural analysis	The pupil must identify root words, suffixes, compound words, and contractions.	10	65.8	66.3	67.5	67.9	80.9	80.8	81.1	81.8	Teacher says: "Mark the combination of letters that is the correct division of the underlined word." firehouse O fi + rehouse O fire + house O fireh + ouse
II. VOCABULARY	(Total and averages for vocabulary skill areas)	(60)	(67.7)	(67.6)	(68.6)	(69.1)	(82.6)	(82.9)	(83.4)	(83.9)	
A. Denotation	The pupil must choose the response word that best fills the blank in the sentence.	22	68.8	68.9	69.6	70.2	84.0	83.6	84.6	84.9	Teacher says: "Mark the word that goes in the blank in the sentence." Father told Pat to _____ the back door. O leave O fast O close
B. Relational	(Total and averages for relational skill areas, a subcategory of vocabulary)	(38)	(67.0)	(66.8)	(68.0)	(68.5)	(81.8)	(82.5)	(82.7)	(83.3)	
1. Synonyms	The pupil must choose the response word that means the same as the underlined word in the phrase.	24	67.6	67.0	68.3	68.6	83.2	83.5	83.9	84.4	Teacher says: "Mark the word that means the same as the word that is underlined." a small dog O cute O little O happy O funny

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]								Illustrative test question[2]
			Grade two				Grade three				
			1974-5	1975-6	1976-7	1977-8	1974-5	1975-6	1976-7	1977-8	
2. Antonyms	The pupil must choose the response word that means the opposite of the printed stimulus word.	10	65.7	65.7	67.2	68.0	78.4	80.4	80.1	81.0	Teacher says: "Mark the word that means the opposite of the underlined word." light — O evening O dark O bright
3. Homonyms	Although the format of this test item is the same as that used for denotation, the pupil must choose the response word from among three having the same sound.	4	66.5	67.2	68.6	68.8	82.4	81.5	81.9	82.3	Teacher says: "Mark the word that goes in the blank in the sentence." We have _____ dogs. O to O too O two
III. COMPREHENSION	(Total and averages for comprehension skill areas)	(110)	(61.3)	(61.3)	(62.4)	(62.8)	(77.0)	(76.7)	(77.1)	(77.6)	
A. Literal	Given a passage of printed material, the pupil must choose the correct response to a written question that requires identifying or remembering elements in the passage which were explicitly stated.	77	62.5	62.3	63.4	63.8	77.9	77.5	78.0	78.5	Dear Children: I hope that you are having a good time and working hard. I have missed the whole class very much. Miss Smith has been telling me that you have been very helpful to her. Thank you for all your cards and flowers. I have even had a few surprise visits from some of you! I hope to be back as your teacher soon. Until then, your get well cards made me think of you. Your teacher, Mrs. Black What have the children sent Mrs. Black? O cards and telephone calls O cards and flowers O flowers and clothes O food and clothes

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]								Illustrative test question[2]
			Grade two				Grade three				
			1974-5	1975-6	1976-7	1977-8	1974-5	1975-6	1976-7	1977-8	
B. Interpretive	Given a passage of printed material, the pupil must choose the correct response to a written question that requires using ideas and information, explicitly stated, to paraphrase, infer from, relate, or generalize from elements in the passage.	33	58.7	59.1	60.0	60.4	74.9	74.9	75.0	75.5	Where has Mrs. Black been: 0 on a trip 0 teaching in another class 0 sick 0 visiting out of town
IV. STUDY-LOCATIONAL SKILLS	(Total and averages for study-locational skill areas)	(20)	(75.5)	(77.2)	(77.9)	(79.4)	(88.0)	(88.0)	(88.8)	(89.6)	
A. Alphabetizing	The pupil must choose which letter or word comes first in alphabetical order.	10	73.8	75.5	76.3	78.3	87.8	87.3	87.9	88.8	Teacher says: "Mark the word that comes first in alphabetical (ABC) order." 0 dent 0 drive 0 dart 0 dog
B. Table of contents	Given a table of contents and a page number, the pupil must choose the story that begins on the given page.	10	77.3	79.0	79.6	80.5	88.2	88.8	89.7	90.4	Teacher says: "A page number is underlined. Look at the table of contents and then mark the title of the story that begins on the page that is underlined." TABLE OF CONTENTS The Happy Puppy .... 6 John's Pet Frog .... 12 The Little Horse ...... 19 Moles .... 28 The Lost Turtle .... 32 Page 19 0 The Happy Puppy 0 John's Pet Frog 0 The Little Horse 0 Moles

APPENDIX B

Reading Performance, by Skill Area, of California Sixth-Grade Pupils for 1975-76, 1976-77 and 1977-78

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
TOTAL READING TEST		(128)	(66.1)	(65.9)	(66.3)	
I. WORD IDENTIFICATION	The pupil must identify correct pronunciation of words used in context, root words, the meaning of affixes, and contractions.	18	74.3	74.2	74.7	The ending of the word tallest makes the word mean: 0 as tall as 0 less tall 0 taller than 0 most tall
II. VOCABULARY	The pupil must identify the meaning of a specific word in context.	25	67.1	66.3	66.9	The boys made a hasty decision to go camping over the weekend. The word "hasty" as used here means: 0 hurried 0 wrong 0 thoughtful 0 hard
III. COMPREHENSION		(69)	(64.9)	(64.9)	(65.2)	
A. Literal	The pupil must identify or remember elements which have been explicitly stated. These elements include main ideas, details, and cause-and-effect relationships.	39	67.4	67.2	67.5	Travelers say our roads would be safer if we changed present road signs to picture symbols, or glymphs. With these picture signs it is not necessary for travelers to learn the language of a country to understand the directions. No words are used on the signs. Those who favor using glymphs in the United States admit that drivers would have to learn the picture symbols first. A glymph is a: 0 traveler 0 road 0 picture 0 word

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[1] The values presented in this column are averages of the percents of questions answered correctly. The percentages for individual items may vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
B. Interpretive/Critical	The pupil must use ideas and information explicitly stated to infer from, relate, or generalize from elements in the materials read. These elements include main ideas, details, cause-and-effect, and author's purpose.	30	61.8	62.0	62.2	Glymphs will probably help 0 prevent accidents 0 the blind 0 you learn to read 0 you learn other languages
IV. STUDY-LOCATIONAL	The pupil must identify which reference book to consult and be able to use parts of a book such as an index and table of contents.	16	60.0	59.8	60.5	If you wanted to know the meaning of the word candid, the best book to use would be: 0 a dictionary 0 an encyclopedia 0 an atlas 0 the card catalog

APPENDIX C

Reading Performance, by Skill Area, of California Twelfth-Grade Students for 1975-76, 1976-77, and 1977-78

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
TOTAL READING TEST		(141)	(64.1)	(63.6)	(63.3)	
I. VOCABULARY	The student must identify the meaning of a specific word in context; given a definition, the student will select from a list the word most nearly opposite in meaning.	31	61.3	60.9	60.5	The word "peers" in the last sentence means: O other congressmen O the voters O Speakers of the House O committee chairmen
II. COMPREHENSION		(97)	(64.5)	(63.9)	(63.7)	
A. Literal	From a paragraph or passage, the student must identify or remember elements which have been explicitly stated. These elements include main ideas, details, sequence, and cause-and-effect relationships.	47	69.2	68.9	68.5	The current reform described in these paragraphs was begun by: O Republican Congressmen O Democratic Congressmen O "Uncle Joe" Cannon O Democratic Senators
B. Interpretive/Critical	From a paragraph or passage, the student must use ideas and information explicitly stated to paraphrase, infer from, relate, or generalize from elements. These elements include main ideas, details, cause-and-effect, and author's purpose.	50	60.1	59.3	59.2	In the future, committee chairmen will probably O opt for a cleaner system. O have to be more responsible. O be selected by "Uncle Joe." O examine the effects of the earthquake.
III. STUDY-LOCATIONAL	The student must identify which reference book to consult and be able to use parts of a book, such as an index and table of contents.	13	68.4	67.2	66.6	To discover last year's Gross National Product for the United States, you should consult: O a dictionary O a thesaurus O an almanac O an encyclopedia

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[1] The values presented in this column are averages of the percents of questions answered correctly. The percentages for individual items may vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

APPENDIX D

Written Expression and Spelling Performance, by Skill Area,
of California Sixth-Grade pupils for 1975-76, 1976-77 and 1977-78

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
TOTAL WRITTEN EXPRESSION TEST		(128)	(62.5)	(63.6)	(64.1)	
I. WORD FORMS (see Morphology, Test Content Specifications)	The pupil must select the appropriate suffix (-ed, -ing, -s, -ly, -er, -est, 's) for a word in a given sentence.	16	82.4	82.3	82.9	Fill in the oval next to the word that best fits each sentence. The children were still _____ in the pool. O play O plays O playing O had played
II. STANDARD USAGE	The pupil must select the verb or pronoun in a sentence which reflects standard English usage.	16	75.3	75.3	75.8	Fill in the oval next to the word that best fits each sentence. Leroy _____ the movie yesterday. O saw O seen
III. LANGUAGE CHOICES	The pupil must select the most vivid verb or specific noun for a given sentence.	26	54.4	56.5	55.2	Pretend that you are writing a story. Fill in the oval next to the word that will give your reader the best picture of what's happening. The snake _____ across the grass. O moved O slithered O went

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[1] The values presented in this column are averages of the percents of questions answered correctly. The percentages for individual items may vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
IV. SENTENCE RECOGNITION	The pupil must recognize complete sentences, fragments, run-ons, and normal English word order in sentences.	22	62.3	63.0	63.7	Fill in the oval next to the group of words which needs more to make it a complete sentence. ○ They bought a house. ○ She is hungry. ○ Pedro is not there. ○ In the heat of the day.
V. SENTENCE MANIPULATION	The pupil must select the most effective sentence or sentence element.	16	61.7	62.6	63.1	The following sentences say the same thing differently. Fill in the oval next to the best sentence. ○ My brother went and broke the new clock. ○ The new clock was broke by my brother. ○ The new clock was broken because of my brother. ○ My brother broke the new clock.
VI. CAPITALIZATION	The pupil must recognize words in a sentence which should be capitalized, such as the beginning word of a sentence, names of persons and places, days of the week, and months of the year.	14	57.4	58.4	59.8	Fill in the oval next to the line with the mistake in capitalization. If there is no mistake, fill in the fourth oval. ○ In social studies we are ○ learning about many countries. ○ my favorite is Israel. ○ (No mistakes)
VII. PUNCTUATION	The pupil must identify errors in the use of the period, question mark, exclamation point, comma, apostrophe, and quotation marks.	18	52.4	52.5	54.4	Look at the underlined portion to see if there is an error. If you find an error in punctuation, fill in the oval next to the letter of that error. If there is no error, the answer is D. "I dont mean to refuse the doctor's advice, but A B I still believe that sunshine is the best cure for a cold," said Aunt Olive. No error. C D ○ A ○ B ○ C ○ D

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
VIII. SPELLING		(64)	(63.6)	(63.6)	(64.1)	
A. Relationships	From a list of 3 or 4 words, the pupil must identify the incorrect spelling relationship for vowel and consonant sounds.	35	58.1	58.1	58.6	Fill in the oval next to the misspelled word in each group. If there is no misspelled word, the answer is "all correct." O steam O screem O sleeve O All correct
B. Word Forming	The pupil must select the correct spelling pattern used in a variety of common word formations.	29	70.2	70.3	70.8	Pairs of words are given below. In each pair, one word is spelled incorrectly. Fill in the oval next to the correct spelling. O steped O stepped

APPENDIX E

Written Expression and Spelling Performance, by Skill Area, of California Twelfth-Grade Students for 1975-76, 1976-77, and 1977-78

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
TOTAL WRITTEN EXPRESSION TEST		(142)	(62.3)	(61.9)	(62.1)	
I. WORD FORMS (see Morphology Test Content Specifications)	The student must select the appropriate inflectional suffix (-ed, -ing, -s, -ly, -er, -est) for a given sentence, must discriminate between form class words (such as nouns and verbs) and structure words (such as prepositions), and must demonstrate dictionary skills for a variety of purposes.	26	72.6	72.1	72.1	The dogs had _____ the long trek. ○ survival ○ survivors ○ surviving ○ survived
II. LANGUAGE CHOICES	The student must identify attitude-conveying words and phrases, must differentiate between specific and general sets of words, and must identify the audience of a prose passage.	32	66.9	66.7	66.6	Which of the following is most specific? ○ plant ○ redwood ○ tree ○ living thing
III. SENTENCE RECOGNITION	The student must recognize complete sentences, sentence parts, sentence patterns, and appropriate subject-verb relationships.	20	67.3	67.7	68.4	Identify the group of words which is incomplete or needs additional words to complete the meaning. ○ Mack and Sonny skipped school. ○ The rising clouds of dust. ○ The day was hot and clear. ○ Twelve o'clock is lunchtime.

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[1] The values presented in this column are averages of [illegible] percents of questions answered correctly. The percentages for individual items may vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
IV. SENTENCE MANIPULATION	The student must select the most economical, effective sentence and must be able to recognize effective coordination and subordination within sentences.	12	42.9	42.9	43.4	Mark the sentence below which expresses the thought most EFFECTIVELY and ECONOMICALLY. ○ He spoke to me in a very warm manner when we met each other Tuesday. ○ When we met Tuesday, I was spoken to in a very warm manner by him. ○ His manner was very warm when meeting and speaking to me Tuesday. ○ Tuesday he greeted me warmly.
V. PARAGRAPHS	The student must identify irrelevant material in a paragraph, recognize inconsistent time development, select the logical sequence of a group of sentences, select the sentence which best summarizes the ideas presented in one or more related paragraphs, and identify transitional elements within a paragraph.	26	59.9	59.1	59.3	Which of the following phrases is used to indicate a connection between the two (given) paragraphs? ○ Could not know ○ Even so ○ They lead ○ They shape
VI. CAPITALIZATION AND PUNCTUATION	The student must recognize capitalization and/or punctuation errors in sentences.	28	54.6	54.3	54.7	Identify any capitalization or punctuation errors in the underlined parts of the following sentence. The Hills, who have just returned from lake Tahoe, A B are already planning next winter's trip. No error. C D ○ A ○ B ○ C ○ D
VII. SPELLING	The student must decide if an underlined word in a given sentence is spelled correctly.	72	68.0	67.9	68.4	Fill in the oval next to "right" if the word is spelled correctly or next to "wrong" if the word is spelled incorrectly. Carmen steped on my toes. ○ right ○ wrong

APPENDIX F

Mathematics Performance, by Skill Area, of California Sixth-Grade Pupils for 1975-76, 1976-77 and 1977-78

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
TOTAL MATHEMATICS TEST		(160)	(57.4)	(57.7)	(58.5)	
I. ARITHMETIC		(96)	(61.0)	(61.0)	(61.8)	
A. Number concepts		(28)	(65.4)	(65.5)	(65.6)	
1. Number and numeration	The pupil must identify whole numbers, fractions, and decimals; identify place value; and recognize points on a number line.	13	75.0	75.6	76.3	What digit is in the tens' place in 4,263? ○ 2 ○ 3 ○ 4 ○ 6
2. Number theory	The pupil must recognize odd, even, prime, and composite numbers and choose the lowest common multiple or greatest common factor of several numbers.	9	56.1	56.1	56.0	What is the greatest common divisor of 8, 12, and 16? ○ 4 ○ 8 ○ 12 ○ 16
3. Number properties	The pupil must recognize commutative, associative, and distributive properties of operations on numbers.	6	58.6	57.8	56.6	Name the missing number. $6 \times 15 = \square \times 6$ ○ 9 ○ 15 ○ 90 ○ None of these

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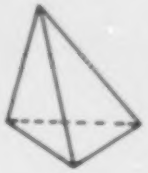
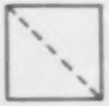
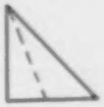
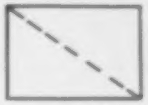
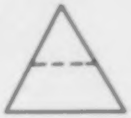
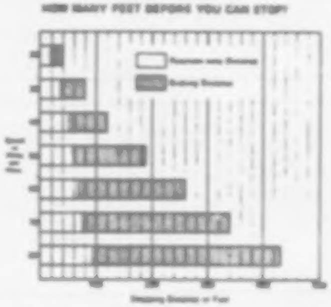
[1] The values presented in this column are averages of the percents of questions answered correctly. The percentages for individual items may vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
B. Whole numbers		(28)	(66.9)	(67.5)	(68.0)	
1. Computation	The pupil must perform addition, subtraction, multiplication, and division involving whole numbers.	16	77.4	77.9	78.8	6003 -209 O 6,794 O 5,894 O 5,804 O 5,794
2. Application	The pupil must apply the four arithmetic operations on whole numbers, solving problems presented in a daily life context.	12	52.9	53.6	53.7	Joe packs tomatoes 4 to a box. If he has packed 18 tomatoes, which box is he now packing? O the fourth O the fifth O the sixth O the eighteenth
C. Fractions		(20)	(49.6)	(49.0)	(50.6)	
1. Computation	The pupil must perform addition, subtraction, multiplication, and division involving fractional numbers.	13	50.5	49.8	52.0	4 x 4/7 = O 1 2/7 O 2 2/7 O 4 4/7 O 7
2. Application	The pupil must use the four arithmetic operations on fractions and mixed numbers to demonstrate comprehension or ability to solve problems in a daily life context.	7	48.0	47.5	47.9	Jack's spelling test had 60 words, He spelled 3/4 of the words correctly. How many words did Jack misspell? O 60 O 45 O 15 O 4
D. Decimals		(20)	(56.3)	(57.8)	(59.0)	
1. Computation	The pupil must perform addition, subtraction, multiplication, and division involving decimal numbers.	12	56.6	58.9	60.6	62.1 - 41.4 = O 10.7 O 20.7 O 21.7 O None of these
2. Application	The pupil must use the four arithmetic operations on numbers in decimal form to demonstrate understanding of principles and ability to solve problems in a daily life context.	8	55.8	56.2	56.7	The Wards' total expenses during the 8 days at the ranch were $491.60. What was the average cost per day? O $61.45 O $61.32 O $60.20 O None of these

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
II. GEOMETRY		(20)	(58.8)	(58.5)	(59.3)	
A. Knowledge of facts	The pupil must be able to identify basic geometric figures.	8	68.7	68.4	69.7	 This figure is called a: ○ pyramid ○ prism ○ cylinder ○ cone
B. Application	The pupil must be able to comprehend and apply basic geometric knowledge and concepts.	12	52.2	51.9	52.3	Which of the following figures is divided by a line of symmetry? ○  ○  ○  ○ 
III. MEASUREMENT AND GRAPHS		(32)	(52.1)	(53.5)	(54.4)	
A. Knowledge of facts	The pupil must be able to estimate length and volume, convert length, mass, volume, and time from one unit to another unit; perform arithmetic operations on quantities of length, mass, volume, and time.	14	44.8	47.2	48.0	3 yards 1 foot = ○ 4 feet ○ 7 feet ○ 10 feet ○ 13 feet

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
B. Application	The pupil must be able to solve problems related to measurement of length, area, mass, and volume.	18	57.8	58.4	59.5	 Use the above graph to find the top safe speed for stopping within a maximum distance of 140 feet. ○ 30 miles per hour ○ 40 miles per hour ○ 50 miles per hour ○ 120 miles per hour
IV. PROBABILITY AND STATISTICS		(12)	(40.4)	(40.9)	(41.6)	
A. Computation	The pupil must be able to compute probability of simple events and compute the mean, mode, and median of a set of given numbers.	6	42.4	42.3	42.9	If an event is certain to occur, then the probability of that event is: ○ 1/2 ○ 1 ○ 100 ○ zero
B. Application	The pupil must be able to solve problems related to elementary concepts in probability and statistics	6	38.5	39.6	40.2	A bowl contains one white marble, two red marbles, and three blue marbles. If you were blindfolded and then removed one marble from the bowl, what is the probability that the marble you removed would be red? ○ zero ○ 1/3 ○ 1/2 ○ 2/3 ○ None of these

APPENDIX C

Mathematics Performance, by Skill Area, of California Twelfth-Grade Students for 1975-76, 1976-77, and 1977-78

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
TOTAL MATHEMATICS TEST		(198)	(67.0)	(66.3)	(66.3)	
I. ARITHMETIC		(98)	(72.9)	(72.1)	(72.2)	
A. Number concepts		(28)	(74.3)	(73.5)	(73.6)	
1. Number and numeration	The student must identify whole numbers, fractions, and decimals; identify place value; and recognize points on a number line.	14	71.0	70.1	69.9	In which numeral is the digit 7 in the tens' place? ○ 976.3 ○ 97.63 ○ 9.763 ○ 0.9763
2. Number theory	The student must recognize odd, even, prime, and composite numbers and choose the lowest common multiple or greatest common factor of several numbers.	8	76.2	75.9	76.4	If n is an odd number, what can you say about $n + 1$? ○ It is always odd. ○ It is always even. ○ It is even or odd depending upon what n is. ○ None of these
3. Number properties	The student must recognize commutative, associative, and distributive properties of operations on numbers.	6	79.6	78.5	78.6	$\square \times 7 = (4 \times 7) + (5 \times 7)$ What number goes in the ☐ above? ○ 2 ○ 8 ○ 9 ○ 20

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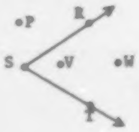
[1] The values presented in this column are _averages_ of the percents of questions answered correctly. The percentages for individual items vary from the average value by 20 or more points.

[2] These sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
B. Whole numbers		(22)	(80.1)	(80.1)	(80.1)	
1. Computation	The student must perform addition, subtraction, multiplication, and division involving whole numbers.	14	80.9	81.0	81.2	504 - 99 0 405 0 415 0 495 0 505
2. Application	The student must apply the four arithmetic operations on whole numbers in solving problems presented in a daily life context.	8	78.7	78.5	78.2	A parking lot has 25 rows with 18 spaces for cars in each row. If 3 rows are removed for a driveway, what is the greatest number of cars which can be parked on the lot? 0 375 0 396 0 414 0 447 0 None of these
C. Fractions		(26)	(66.0)	(64.5)	(64.3)	
1. Computation	The student must perform addition, subtraction, multiplication and division involving fractional numbers.	14	70.4	68.3	68.4	4 x 4/7 = 0 1 2/7 0 2 2/7 0 4 1/7 0 7
2. Application	The student must use the four arithmetic operations on fractions, mixed fractions, or whole numbers and fractions to demonstrate comprehension or ability to solve problems in daily life context.	12	60.9	60.0	59.5	Jack's spelling test has 60 words. He spelled 3/4 of the words correctly. How many words did Jack misspell? 0 80 0 45 0 15 0 4
D. Decimals		(22)	(71.8)	(71.2)	(72.0)	
1. Computation	The student must perform addition, subtraction, multiplication, and division involving decimal numbers.	14	74.1	73.8	74.8	786.4 - 34.87 = 0 4.377 0 43.77 0 751.53 0 7,515.3

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
2. Application	The student must use the four arithmetic operations on numbers in decimal form to demonstrate understanding of principles and ability to solve problems in daily life context.	8	67.8	66.6	67.2	If Beth can drive 18.7 miles on each gallon of gas, how many miles can she drive on 7 gallons? O 126.9 O 130.9 O 140.9 O 1309 O None of these
II. ALGEBRA		(32)	(62.9)	(62.1)	(61.8)	
A. Computation	The student must be able to perform addition, subtraction, multiplication, and division of algebraic variables and identify a point shown on a rectangular coordinates.	14	66.4	65.9	65.5	If $7x - 38 = 18$, then $x =$ O -8 O -5 O zero O 5 O 8
B. Application	The student must be able to construct an algebraic equation to solve a given problem and be able to interpret tables, charts, and graphs.	18	60.1	59.2	58.8	The following formula can often be used to approximate the weight for boys between the ages of 1 to 7: $\underline{W} = 8 + 2 \cdot 2\ \underline{A}$ Where $\underline{W}$ is the weight in kilograms and $\underline{A}$ is the boy's age in years. The formula tells that for each year older that a boy becomes, he should weigh: O 8 kilograms more O 8 kilograms less O 2.2 kilograms more O 2.2 kilograms less
III. GEOMETRY		(26)	(62.7)	(62.1)	(61.8)	
A. Knowledge of facts	The student must be able to identify basic geometric sets and figures.	12	75.2	75.5	75.5	 Which of the points are in the interior of angle RST? O P only O V only O V and W O R, S, and T

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
B. Application	The student must be able to comprehend and apply basic geometric knowledge and concepts.	12	50.1	48.7	48.1	In the plane of a circle with radius 5.04 inches, if a point P lies 5.4 inches from the center of the circle, then P lies: O on the circle O at the center of the circle O outside the circle O inside the circle but not at the center
IV. MEASUREMENT		(30)	(60.5)	(59.5)	(59.4)	
A. Knowledge of facts	The student must be able to estimate length and volume; convert length, mass, volume, and time from one unit to another unit; and perform arithmetic operations on quantities of length, mass, volume, and time.	12	71.6	70.5	70.1	10 decimetres = 1 metre 1000 millimetres = 1 metre The length of a piece of chalk is 0.5 decimetre. What is its length in millimetres? O 0.05 O 5 O 50 O 500
B. Application	The student must be able to solve problems related to measurement of length, area, mass, and volume.	18	53.1	52.2	52.2	A housewife will pay the lowest price per ounce for rice if she buys it at the store which offers: O 12 ounces for 40 cents O 14 ounces for 45 cents O 1 pound, 12 ounces for 85 cents O 2 pounds for 99 cents
V. PROBABILITY AND STATISTICS		(14)	(57.2)	(56.9)	(57.3)	
A. Computation	The student must be able to compute the probability of simple events and compute the mean, mode, and median of a set of given numbers.	6	57.9	57.6	58.3	Tom, Dick, and Harry lined up to enter their classroom. What is the probability that Tom was the first one in line? O zero O 1/3 O 2/3 O 1 O None of these

Skill area	Description of skills assessed	No. of items	Average percent of questions answered correctly[1]			Illustrative test question[2]
			1975-76	1976-77	1977-78	
B. Application	The student must be able to solve problems related to elementary concepts in probability and statistics.	8	56.6	56.3	56.5	Three of four boys each weighs 60 pounds. What is the weight of the fourth boy if the average of the weights of all four boys is 70 pounds. ○ 130 pounds ○ 100 pounds ○ 80 pounds ○ 65 pounds

APPENDIX H

A Description of Equating Procedures Used in the California Assessment Program

Grade Three

School-level frequency distributions of the total reading score from the Spring, 1977 administration of the Comprehensive Tests of Basic Skills, Form S, Level 1, were obtained from 11 districts: Fountain Valley, Fullerton, Santee, Pomona, Compton, South San Francisco, Redwood City, Salina City, Ukiah, Berkeley, and Ceres. For each school, the number of students tested on the CTBS and the number tested on the Reading Test, Spring, 1977 administration, were compared. When the difference in the number of pupils tested exceeded 10 percent, the school was eliminated. Nineteen schools were eliminated for that reason. They were replaced by 19 schools from San Jose Unified. The total final sample included 138 schools, with 8,699 pupils tested on the CTBS, and 8,589 tested on the Reading Test, after scores of non-English speaking pupils had been eliminated.

The frequency distribution for the 8,699 CTBS scores was totalled. The scores of the 8,589 pupils tested on the Reading Test were used to estimate what the mean and variance of total test scores would have been had all students taken the full 250-item Reading Test. The obtained mean and variance were used to estimate what the distribution of scores would have been had all students taken the total test by assuming that those total test scores would have distributed themselves as a negative hypergeometric distribution.

The two frequency distributions--the actual obtained one for the CTBS, and the estimated one for the Reading Test--were used to develop an equipercentile equating line. This is done by taking any point in one distribution, computing the percent of scores lying below that point in the distribution, and then finding the point in the second distribution that has that same percent of scores lying below it.

The distributions of scores that would have occurred had all pupils in California taken the full 250-item Reading Test, rather than a 25 item sample were estimated for grades two and three. At both grades, this was done by first computing the estimated total-test variance from a 2 percent systematic sample of all pupils tested. Again assuming that scores statewide followed a negative hypergeometric distribution, the sample variance and population mean then were used to estimate the statewide distribution of scores.

From these two distributions, it was estimated that if all pupils in the state had taken the full 250-item Reading Test in 1977, the median score for grade two would have been 182.0, and for grade three, 221.0. From the equating line, these scores equated to CTBS total reading scores of 33 and 53, respectively. A total reading score of 33 on the CTBS at the second grade is the 55th percentile; a score of 53 at the third grade is the 56th percentile.

Grade Six

Equating for grade six was done in a manner very similar to that for grade three. District-level frequency distributions for the total reading, total language, and total mathematics scores from the Spring, 1977 administration of the Comprehensive Tests of Basic Skills, Form S, Level 2, were obtained from seven districts: South San Francisco, Turlock, Santee, San Jose, Ukiah, Ceres, and Fountain Valley. These seven districts were chosen because they had administered the CTBS to their entire sixth grade population. This was verified against the number tested on the Survey of Basic Skills: Grade 6. The total sample included 6,876, 6,830, and 6,845 students tested on the CTBS in reading, language, and math, respectively, and 6,753 students tested on the SBS.

Equipercentile equating lines were developed for all three areas using the same procedures developed for grade three. The statewide variance was estimated from a one-thirtieth systematic sample of the state. Then, the statewide median was estimated, by content area, for the total SBS by assuming scores followed a negative hypergeometric distribution with the population mean and estimated population variance. The estimated median scores on the SBS were 88.3 (out of 128 items) for reading, 84.1 (out of 128 items) for written expression, and 93.5 (out of 160 items) for mathematics. These equated to CTBS raw scores of 63, 79, and 74 for total reading, total language, and total mathematics, respectively. The corresponding publisher percentile ranks of these scores were 53, 51, and 51.

Grade Twelve

Prior to 1974-75, California twelfth-grade students had been tested with the Iowa Tests of Educational Development. In January of 1975, the new state-developed test, Survey of Basic Skills: Grade 12, was introduced. In spring, 1975, a special study was conducted to estimate what the statewide performance of California twelfth-grade students would be if they had taken one of the three standardized tests in January, 1975: Iowa Tests of Educational Development (ITED), Sequential Tests of Educational Progress (STEP Series II), and the Tests of Academic Progress (TAP). Using the estimated performance on the publishers' tests and the data from the administration of the new state-developed tests, estimates of California student performances in comparison to national norms were also obtained for 1975-76 and 1976-77.

Estimation of National Norm Comparisons for 1974-75. Data from the following samples of students were used for estimating the performance of the state's median student on selected standardized tests: (1) A 10 percent random sample of 25,000 students drawn from the entire state population of twelfth-graders, with scores on the Survey of Basic Skills: Grade 12, and (2) A stratified random sample of 105 schools with about 30,000 grade-twelve students. All grade-twelve students in each of the schools in the stratified sample were administered one part (content area) of the following standardized tests in the spring of 1975: ITED Reading, Language, or Mathematics; STEP Series II, Reading, English Expression, or Mathematics; TAP Reading, Composition, or Mathematics. The data on these students were also available from the January, 1975 statewide administration of the grade-twelve Survey. By matching students within a school on the basis of their birthday and sex, the data from the standardized tests were paired with that of the Survey. Approximately 15,000 students comprised the matched sample.

The procedure for estimating the performance of the median California student as compared to publishers' norms included the following steps.

1. Linear Equating of the Survey Forms. The total number of items in the Survey were spread over 18 forms in a stratified random sampling fashion. Each form had an approximately equal number of items in the three content areas: reading, written expression, and mathematics. Since items were not exactly equal in each form and since the difficulty value of the item cluster within each content area varied from form to form a linear equating procedure was used to convert the raw scores to a common scale scores. For each content area the raw scores on 17 forms were equated to the scale score of the chosen form. The transformation equation took the following form.

$$Y = aX + b$$

$$\text{where,} \quad a = \frac{SD_Y}{SD_X} \qquad \text{and} \qquad b = \bar{Y} - a\bar{X}.$$

2. Estimation of Median Student Performance. The performance of the state's twelfth-grade median student on each of the nine standardized tests (three tests by three content areas) was estimated by means of a frequency estimation procedure[1]. The purpose of the frequency estimation procedure was to estimate a marginal frequency distribution for each standardized test, given only to a smaller group, using the bivariate distribution of the standardized test with the Survey given to the same small group, and the univariate distribution of the Survey given to a larger group. The marginal frequency distribution of the standardized test gave the estimated distribution that would have resulted if all California twelfth-graders had taken the standardized test. The raw score corresponding to the median of the estimated distribution represented the performance of the median student on the standardized test. The estimated raw score was then converted to the percentile ranking corresponding to the publisher's norm sample. The statewide performance on the three standardized tests in the three content areas--reading, written expression, and mathematics--are given in Table 21.

Estimation of National Norm Comparisons for 1975-76. The student performance in 1975-76 on publisher's test was estimated by assuming that the z-score change from 1974-75 to 1975-76 on the standardized test would be equal to the observed z-score change during the same two years on the Survey. Furthermore, it was assumed that the performance on the typical California twelfth-grade student was represented by the mean statistic both on the standardized test and on the Survey. In particular, the following equation was used to calculate the performance of the twelfth-grade students in 1975-76 on the standardized test in raw score unit:

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[1] For details of frequency estimation procedure, see Bianchini, J.C., "Estimation of California Statewide Performance on Selected Standardized Tests at Grades 6 and 12," ETS, Berkeley, California, 1975.

$$Y' = Y + \frac{SD_Y}{SD_X} (X' - X)$$

where,

Y' = Estimated raw score on the standardized test in 1975-76
Y = Mean raw score on the standardized test in the year 1974-75

X' = Mean Survey score on common items in 1975-76
X = Mean Survey score on common items in 1974-75
SD_Y = Standard deviation of the student scores reported by the publisher
SD_X = Estimated standard deviation of the student scores on the Survey

The standard deviation of the student scores on the Survey was estimated using the following relationship.

$$\frac{\text{Standard deviation of the district scores on the Survey}}{\text{Standard deviation of the student scores on the Survey}} = \frac{\text{Standard deviation of the district scores on the ITED}}{\text{Standard deviation of the student scores on the ITED}}$$

The standard deviations of the student and district scores on ITED were available from the statewide testing program data for 1973-74. The standard deviation of the district scores on the Survey was calculated from the data available from the 1975-76 administration of the Survey.

The percentile rank corresponding to the estimated mean on the standardized test, Y', was obtained using the test publisher's norm table. The percentile ranks were linearly interpolated from the norm table, if necessary, to find the percentile ranking corresponding to a fractional raw score. Table 24 provides the estimated performance of California twelfth-grade students for 1975-76.

Estimation of National Norm Comparison for 1976-77 and 1977-78. The estimation procedures for 1976-77 and 1977-78 were the same as the procedures used in 1975-76 except that in the later years' estimations, the values of X and X' were based upon all item data because the tests for the three years were exactly the same. Table 24 provides the estimated performance of California twelfth grade students for 1976-77 and 1977-78.

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